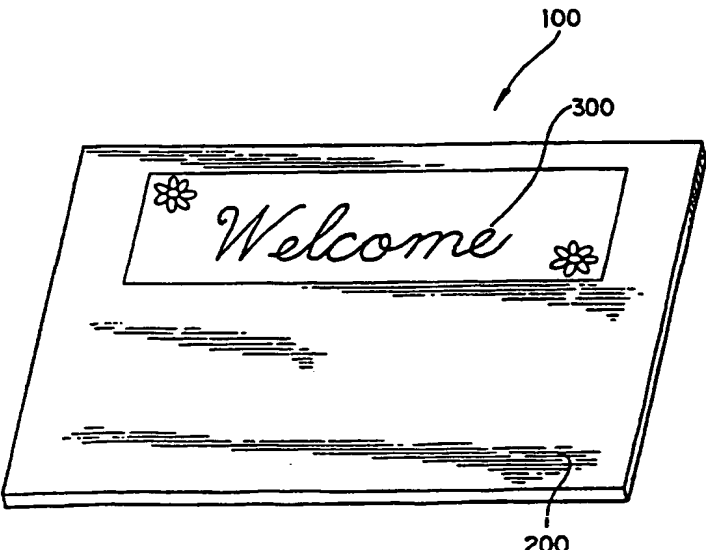




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>A47L 23/22</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/65980</b> <b>(43) International Publication Date:</b> 9 November 2000 (09.11.00)
<b>(21) International Application Number:</b> PCT/US00/11772 <b>(22) International Filing Date:</b> 2 May 2000 (02.05.00)  <b>(30) Priority Data:</b> 09/304,051           4 May 1999 (04.05.99)           US 09/418,752           15 October 1999 (15.10.99)       US 09/553,234           19 April 2000 (19.04.00)       US  <b>(71) Applicant:</b> TECH MATS LLC [US/US]; Suite B, 3904 Franklin Road, Roanoke, VA 24014 (US).  <b>(72) Inventors:</b> BLUM, Ronald, D.; 5320 Silver Fox Road, Roanoke, VA 24014 (US). DUSTON, Dwight, P.; 59 Fairlane, Laguna Niguel, CA 92677 (US). BLUM, Bradley, J.; 3002 Rosalind Avenue, Roanoke, VA 24014 (US).  <b>(74) Agents:</b> WELLS, William, K. et al.; Kenyon & Kenyon, 1500 K Street, N.W., Suite 700, Washington, DC 20005 (US).		<b>(81) Designated States:</b> AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> ADVANCED FLOOR MAT  <div style="text-align: center;">  </div> <b>(57) Abstract</b> <p>An advanced floor mat (100) is disclosed. In an embodiment of the present invention, the floor mat (100) includes a cleanable portion (300). The floor mat (100) may also include a water dissipation component, a water absorbing component, a cushioning component, customized graphics, a transparent cleanable portion, a tacky surface on the cleanable portion, an antibacterial composition, an antifungal composition, and a fragrance. The cleanable portion (300) may be erodible and may include a plurality of cleanable reusable layers (301-305). If a tacky surface is included in the floor mat, an anti-slip feature may be associated with the tacky surface to help prevent slipping on a possible wet tacky surface. Additionally, a sensor system may be included in the floor mat to assist a user in identifying when the floor mat (100) may require cleaning.</p>		

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Larvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

## ADVANCED FLOOR MAT

This application is a continuation-in-part of Application Serial No. 09/418,752, filed October 15, 1999 which is a continuation-in-part of Application  
5 Serial No. 09/304,051, filed May 4, 1999.

### Background and Discussion of the Invention

The present invention relates to a floor mat. More specifically, the invention provides a floor mat that includes a cleanable portion. The floor mat may also include  
10 a water dissipation component, a water absorbing component, a cushioning component, customized graphics, a transparent cleanable portion, a tacky surface on the cleanable portion, an antibacterial composition, an antifungal composition, and a fragrance. The cleanable portion may be erodible and may include a plurality of cleanable reusable layers. If a tacky surface is included in the floor mat, an anti-slip feature may be  
15 associated with the tacky surface to help prevent slipping on a possibly wet tacky surface. Additionally, a sensor system may be included in the floor mat to assist a user in identifying when the floor mat may require cleaning.

Floor mats are known for cleaning the soles of a person's shoes who is about to enter a particular area or room. One problem with floor mats in general is how to keep  
20 the floor mat sufficiently clean such that it may perform its function of cleaning the person's shoes when, by its very nature, it is purposefully dirtied when performing its

function.

Known floor mats may be comprised of a single, unitary piece of material. Whereas these single structure floor mats may be kept clean by, for example, washing the floor mat, it may be required that the entire floor mat be removed from its location  
5 for washing and thus, the floor mat is not available where desired while the entire mat is being cleaned. Alternatively, even if the mat can be cleaned in-place, which may not be a possibility if it is located in, for example, a carpeted area, it may be inconvenient to clean the mat in-place.

U.S. Patent Number 3,785,102 to Amos discloses a throw-away pad comprising  
10 a plurality of stacked disposable sheets where, when a particular sheet is dirtied, the dirty sheet is removed and disposed of. The next sheet that is exposed after the dirty sheet is discarded is clean and thus, a clean surface is again available. However, there may be problems with comprising the floor mat of disposable sheets. Disposing of each dirty sheet may be uneconomical since each sheet is discarded after it becomes dirty.  
15 Additionally, after some finite number of sheets are disposed of, no sheets will remain and thus no effective cleaning surface is available.

U.S. Patent Number 3,785,102 to Amos also discloses that an adhesive can be provided on each sheet's top surface to improve its ability to remove dirt from a person's shoes. However, again, these sheets are not cleanable and therefore are not  
20 reusable.

U.S. Patent Number 3,717,897 to Amos et al. discloses a pad for cleaning shoes and wheels. The pad includes a thin water-washable adhesive covering its upper surface for removing dirt from shoes and wheels. Whereas the '897 patent discloses a pad with a water-washable adhesive upper surface, the pad is not known for use in  
25 domestic or office-type applications. As stated in the '897 patent, the pad is placed at an entrance doorway leading into a clean room.

Tacky floor mats are by far more popular for utilization in indoor environments that are far removed from exterior outside entrances, such as for clean rooms that are well-within the interior of the building in which they are used, e.g., hospital rooms,  
30 computer chip manufacturing spaces, and gymnasiums. Thus, tacky floor mats are not known for use in areas that are adjacent to entrances that lead from the outdoor

environment for cleaning the soles of a person's shoes prior to entry into the interior of a building, such as for example in an entry foyer or on an outdoor porch.

Tacky floor mats are not known for use in domestic or office-type applications, e.g., home or business office use, because of several known deficiencies. One of these deficiencies is that their tacky surface will not be as effective if it becomes wet. Therefore, if the tacky surface floor mat was utilized in an outdoor environment, such as the outdoor porch mentioned above, or in an indoor environment that is adjacent to or near an outdoor entrance, such as an entry foyer of a home or business, for cleaning a person's shoes prior to further entering the home or business, the mat is likely to become wet and therefore not effective. The mat could become wet from, for example, the moisture in the atmosphere or from moisture carried on the soles of the person's shoes who steps on the mat. Additionally, if the tacky surface becomes wet it may become slippery and thus cause a hazard for the person who steps on it.

Additional deficiencies with using known tacky floor mats for home or office-type applications as discussed above is their likelihood of becoming trip hazards and their lack of aesthetic appeal. In the '897 patent, because the pad is designed for use in clean room environments, it is adhesively adhered to the passageway floor in front of the entrance doorway. This may be satisfactory for retaining the mat in-place in clean room-type of applications, however, if it was attempted to use the '897 pad on a carpeted floor, the pad would not properly adhere to the carpet and thus a trip hazard would be present. This could result in significant liability issues. The '897 pad does not have sufficient mass for it to remain in-place without utilizing an adhesive. Regarding aesthetics, because tacky floor mats are known only for their functional characteristics, and thus for use only in "clean room"-type applications, they are not aesthetically pleasing. Therefore, for at least the above reasons, tacky floor mats are not known for use in home or office-type applications.

Additional drawbacks with known floor mats exist that are directed to issues of customization for a particular purchaser and a lack of additional cleaning properties. A floor mat may be the first object that a visitor to a particular home or business encounters. As such, the owner of the home or business may want to utilize the floor mat to graphically convey an initial greeting or message to the visitor. Whereas floor

mats are known that may include a greeting on them, it is not currently known to allow for a particular purchaser to customize the displayed graphic so that the message is tailored to convey a particular message desired by the purchaser. For example, on Halloween the purchaser may want the floor mat to display a "Happy Halloween" message. In another situation, the purchaser may want to greet a particular visitor with a message such as "Hello, Joe". Currently, it is not known to provide a floor mat where an individual can customize the floor mat to display a particular message that they want to convey and in certain circumstances even change the floor mat's message they want to convey.

10           An additional problem with known floor mats, as mentioned above, is that they are limited in their ability to clean the soles of a person's shoes. Whereas known floor mats may be capable of removing dirt particles from the shoe's soles, they are not able to disinfect the soles nor provide a scent to the soles to assist in masking any unpleasant odors that may be associated with the shoes.

15           An additional drawback with known floor mats, even if they are cleanable, is that they do not assist a user in determining when the floor mat may require cleaning. Generally, the owner or custodian of the floor mat does not continuously or regularly monitor the condition of the floor mat with respect to cleanliness. Therefore, the floor mat could require cleaning, and because the owner is not consciously monitoring the condition of the floor mat, there could be a significant period of time before the owner realizes that the floor mat requires cleaning. Therefore, it would be desirable to assist the owner/custodian of the floor mat in determining when the floor mat requires cleaning.

25           Therefore, it would be desirable to provide an advanced floor mat that could address deficiencies that exist with currently known floor mats. The advanced floor mat of the present invention overcomes deficiencies in the prior art and may include a base portion which incorporates a cleanable portion that is adapted to be removably received within the floor mat. The floor mat may also include features such as a water dissipation capability, a water absorbing capability, a cushioning capability, customized graphics, a transparent portion, a tacky surface on the cleanable portion, an antibacterial composition, an antifungal composition, and a fragrance. The cleanable portion may

include the features of being erodible and containing a plurality of cleanable reusable layers. If a tacky surface is included in the floor mat, an anti-slip feature may be associated with the tacky surface to help prevent slipping on a possibly wet tacky surface. Additionally, a sensor system may be included in the floor mat to assist a user  
5 in identifying when the floor mat may require cleaning. Other features will be apparent from the detailed description which follows.

### **Brief Description of the Drawings**

The various features of the invention will best be appreciated by simultaneous  
10 reference to the description which follows and the accompanying drawings, in which:

Fig. 1 is a perspective view of a floor mat in accordance with an embodiment of the present invention;

Fig. 2 is an exploded perspective view of the floor mat of Fig. 1;

Fig. 3 is an exploded side view of an alternative embodiment of the floor mat  
15 of the present invention;

Fig. 4 is an exploded side view of an alternative embodiment of the floor mat of the present invention;

Fig. 5 illustrates a third alternative embodiment for a tacky insert portion with an anti-slip feature for the floor mat of the present invention;

20 Fig. 6 illustrates a fourth alternative embodiment for a tacky insert portion with an anti-slip feature for the floor mat of the present invention;

Fig. 7 is a side view of the embodiment for the tacky insert portion with an anti-slip feature of Fig. 6;

Fig. 8 is a perspective view of a fifth embodiment for a tacky insert portion with  
25 an anti-slip feature for the floor mat of the present invention;

Fig. 9 illustrates a sixth alternative embodiment for a tacky insert portion with an anti-slip feature for the floor mat of the present invention;

Fig. 10 illustrates the tacky insert portion with an anti-slip feature of Fig. 9 in conjunction with an alternative embodiment for the base portion;

30 Fig. 11 illustrates a seventh alternative embodiment for a tacky insert portion with an anti-slip feature and a water dissipating capability for the floor mat of the

present invention;

Fig. 12 illustrates an alternative embodiment for a tacky insert portion and base portion with a water dissipating capability for the floor mat of the present invention;

Fig. 13 illustrates a sensor system that may be utilized in an embodiment of the  
5 present invention;

Fig. 14 is an embodiment for a floor mat where the tacky portion and the non-tacky portion are separable;

Fig. 15 is a perspective view of an embodiment of the floor mat of the present invention as being used in one step of a process for utilizing the floor mat;

Fig. 16 is a perspective view of the floor mat of Fig. 15 as being used in a  
10 second step of a process for utilizing the floor mat;

Fig. 17 illustrates an alternative embodiment for a floor mat in accordance with the present invention that includes interchangeable base portions;

Fig. 18 illustrates an alternative embodiment for a floor mat in accordance with  
15 the present invention that includes single sheets for the cleanable portion;

Fig. 19 illustrates a roll of sheets that may be utilized with the embodiment of Fig. 18;

Fig. 20 illustrates a storage container that may be utilized with the roll of sheets of Fig. 19;

Fig. 21 illustrates an alternative embodiment for a floor mat in accordance with  
20 the present invention that includes a scraper movable on tracks; and

Fig. 22 illustrates an alternative embodiment for a floor mat in accordance with the present invention that includes a scraper movable on tracks.

## 25 **Detailed Description**

Figure 1 illustrates a first embodiment for a floor mat 100 in accordance with the principles of the present invention. As can be seen in Figure 1, floor mat 100 includes a base portion 200 and a cleanable insert portion 300. As will be further described later in this specification, in this embodiment, cleanable portion 300 is  
30 received within base portion 200 and is removable from base portion 200.

Figure 2 illustrates an exploded, perspective view of the floor mat of Figure 1.



As can be seen in Figure 2, base portion 200 is formed as a generally flat, planar member and defines a recess 210 within the top surface of base portion 200. Base portion 200 provides sufficient weight and mass for supporting cleanable insert portion 300 and maintaining the floor mat's positioning on the surface on which it is placed.

5 Base portion 200 may include, as will be discussed below, a water dissipation capability, a water absorption capability, and a cushioning capability and may be comprised of materials such as polyurethane, polyisoprene and other cross-linked elastomeric materials, such as nylon-6, molded or woven to form a porous structure. Recess 210 can be configured in any of a variety of geometric configurations, however,

10 in the present embodiment, recess 210 is configured in a rectangular shape. Recess 210 has a length  $L_1$  and a width  $W_1$ . The depth of recess 210 is such that it is able to receive within it cleanable insert portion 300 such that when cleanable insert portion 300 is received within recess 210, the top surface of cleanable insert portion 300 lies generally in the same plane as the top surface of base portion 200.

15 The top surface of base portion 200 may be colored with any color depending upon the desires of a particular purchaser, however, it is preferable that a color be utilized that will minimize the visibility of any dirt that is accumulated by base portion 200. For example, it may be desirable that darker colors be utilized for the top surface of base portion 200 rather than lighter colors. However, again, any particular color may

20 be utilized for base portion 200, and particularly the top surface of base portion 200, depending upon the particular desires of an individual. Additionally, the base portion 200 may be either translucent or opaque.

As can be seen in Figure 2, the surface of base portion 200 which defines the bottom of recess 210 may include graphics 220 on that surface. In the illustrated

25 embodiment, the graphics include pictorial representations of flowers and a text message which spells out the word "WELCOME". The present invention is not limited to any particular graphic within recess 210 and the present invention may include any of a variety of different forms of graphics.

Graphics 220 may be modified, and thus customized, by an individual after the

30 floor mat has been purchased by the owner. The owner may customize the mat at their home or office and, thus, a graphic that may be appropriate for a particular situation

may be modified by the individual for display in another situation. For example, the graphic may display a message stating "Happy Halloween" for Halloween and may be modified to display "Happy Holidays" during the winter holiday season. Thus, as can be understood, the graphics are modifiable by a user and thus, may be customized for the particular desires of a particular user.

As stated above, the present invention is not limited to any particular form for graphics 220. The graphics 220 can be customized by a user to include any of a variety of different colors, pictures, messages, or other representations that the user may want to display. In addition, the visible intensity of a color(s) can be modified. For example, a color that glows at night could be included in graphics 220 for an occasion such as Halloween.

Any of a variety of different types of structures or methods may be practiced in the present invention for modifying graphics 220 of floor mat 100 and the present invention is not limited to any particular methodology or structure for modifying graphics 220. Additionally, all of the various embodiments contemplated for providing a modifiable graphic display in the floor mat of the present invention can be incorporated in either, or both, of the base portion or the insert portion. For example, the graphics may consist of pre-formed messages or art forms which may be adhered to either the surface which defines the bottom of recess 210, such as by using an adhesive or fastener assembly, e.g., a hook and loop assembly, or to the underside of insert portion 300 such that, when insert portion 300 is placed within base portion 200, the graphics would be visible through a transparent insert portion.

Alternatively, a variety of different graphics may be stored within floor mat 100 such that a user is able to selectively uncover a particular graphic for display while the other available graphics remain covered within floor mat 100. This type of selectability is known in other mediums where selectivity between a variety of different graphics within a common display panel is desired. For example, advertising bulletin boards at sporting events are able to selectively display a first particular message during a first particular period of time and display a second message during a second period of time on the same bulletin board.

A third possible alternative is to provide a modifiable display on the floor mat.

The display surface can be associated with either the base portion or the insert portion, e.g., on either the bottom surface of recess 210 or attached to the bottom of insert portion 300. A display could be included on the front of the floor mat, on the back of the mat such that it is viewable through a transparent portion of the mat, embedded in the mat, attached to the mat, or integrally formed in the mat. For example, the display could be comprised of a small, thin box of graphics that could attach to a tacky portion and/or a base portion or any other component part of the floor mat. However it is associated with the floor mat, a user may design and display their customized graphic and may subsequently modify that graphic such that it is replaced with another graphic.

10 A display surface such as an erasable writing board could be utilized for this purpose.

It is also contemplated that a modifiable electronic display surface could be provided, such as, for example, a liquid crystal display. The display could be connected to a computer and a computer generated image could be displayed on the display. Thus, the image displayed on the display could be modified by generating a different computer image and displaying that computer image on the display. The display could be associated with base portion 200, such as included within recess 210, or could be included on a bottom surface, facing upward, of insert portion 300. Alternatively, the display could be integrally formed with either of the base portion or the insert portion. The modifiable display could utilize a plurality of different graphics that can be displayed in any of a variety of manners on the display. For example, the graphics could be displayed in a generally fixed position on the display or could scroll across the display, with both exemplary methodologies displaying multiple graphics either individually or in combination.

15  
20

Other alternatives for modifying the graphics 220 of floor mat 100 include using light emitting polymers to create, and thus change, graphics 220. The light emitting polymers can be either applied to, attached to, or woven into the floor mat. The light emitting polymers may be utilized on any portion of floor mat 100, for example, on either the base portion or the insert portion, or on any other portion of the different embodiments for the floor mat. Light emitting polymers are known and described in U.S. Patents 5,945,502, 5,869,350, and 5,571,626, which are incorporated herein by reference in their entirety.

25  
30

Other options for a display are to use electronic ink or electric paper. Electric paper is available from Xerox and is described in U.S. Patents 5,723,204, 5,604,027, 4,126,854, and 4,143,103, which are incorporated herein by reference in their entirety. Electric paper employs thousands of tiny, electrically charged beads, called Gyrricon, each about the width of a human hair, to create pixels. The two-tone beads are embedded inside a liquid-filled plastic sheeting that forms the surface of the paper. Each bead, half-black, half-white, gyrates in response to an electric field. Whether the beads are black- or white-side up determines the image. Because there's no need to refresh the image, and because the screen isn't backlit, electric paper uses only a fraction of the power used by conventional electronic displays. Electromagnetic styluses and printer-like devices can be used for getting images onto the paper.

Electronic ink is available from E Ink Corp., at 45 Spinelli Pl., Cambridge, MA 02138. Electronic ink uses a microencapsulated micromechanical display system. Tiny microcapsules are captured between two sheets of plastic to create pixels. Alternatively, the capsules may be sprayed on a surface. The result is a flexible display material. The tiny capsules are transparent and contain a mixture of dark ink and white paint chips. An electric charge is passed through the capsules. Depending on the electrostatic charge, the paint chips float at the top or rest on the bottom of each capsule. When the paint chips float at the top, the surface appears white. When they rest at the bottom, and thus under the ink, the surface appears black. Each of the two states is stable: black or white. A transparent electromagnetic grid laid over the sheet's surface controls the shape of the image. The display may be wirelessly connected to, for example, a computer and thus, the World Wide Web by utilizing, for example, a Motorola paging system. Text on all displays, if multiple displays are used, can be changed at once by a single editor, through a Web page.

Again, a display, which could utilize any of the methods discussed above for modifying the display, could be associated with any portion of the floor mat, such as base portion 200 within recess 210 or on a bottom surface, facing upward, of insert portion 300. Alternatively, the display could be integrally formed with either of the base portion or the insert portion. The display could be utilized in any of the embodiments disclosed herein for the floor mat of the present invention, including a

floor mat that includes a tacky surface and a non-tacky floor mat embodiment.

In further describing base portion 200, as mentioned above, base portion 200 may also include both a water dissipation component and a cushioning component. The water dissipation component provides for transferring moisture from the soles of a person's shoes that is standing on floor mat 100 to reduce the degree of moisture transferred to cleanable insert portion 300 and the cushioning component provides for conforming the floor mat 100 to the shape of the person's soles such that a greater amount of the debris on the person's soles may be removed by floor mat 100. The present invention is not limited to any particular structure or material for the water dissipation component and the cushioning component. For example, the water dissipation component may be comprised of any of a wide variety of known materials, such as polyamides, vinyls, and polyisoprene. It is desirable, but not required, that the water dissipation component dissipate or move the water and not retain the water. Thus, porous materials, and not hydrophilic materials, are desired. The cushioning component may be comprised of any of a variety of cushioning components to include, for example, foam rubber.

Figure 2 also further illustrates cleanable insert portion 300. As can be seen, cleanable insert portion 300 has a geometric shape which is complementary in size and form to the recess 210 that is formed within base portion 200. As such, cleanable insert portion 300 is able to be received securely within recess 210. Thus, cleanable insert portion 300 has a length  $L_2$  which is just slightly smaller than the length  $L_1$  of recess 210. Likewise, cleanable insert portion 300 has a width  $W_2$  which is also just slightly smaller than width  $W_1$  of recess 210.

On the bottom side 310 of cleanable insert portion 300, i.e., that surface which contacts the surface which defines the bottom of recess 210, an attachment mechanism may be provided such that cleanable insert portion 300 may be removably attached to base portion 200 within recess 210. Any of a variety of different attachment mechanisms may be provided on the bottom surface of cleanable insert portion 300 to include, for example, a hook and loop fastener assembly or an adhesive. Regardless of the particular securement mechanism used to removably attach cleanable insert portion 300 to base portion 200, in this embodiment, cleanable insert portion 300 may be

removed from base portion 200 such that it may be cleaned by a user and, after cleaning, be reinserted within recess 210 such that a clean surface is now provided for floor mat 100.

As stated above, cleanable insert portion 300 may be formed from a transparent material such as hydrophilic aliphatic acrylic polymers and copolymers incorporating acrylic acid, hydroxy ethyl methacrylate, and glycerin monomethacrylate. Forming cleanable insert portion 300 of a transparent material would allow an individual to view the customized graphics that may be provided within floor mat 100, as discussed previously. Alternatively, the insert portion 300 could be opaque.

Additionally, the top side of cleanable insert portion 300 may include a tacky surface. The tacky surface would provide for assisting in removing debris from the soles of a person's shoes that is standing on cleanable insert portion 300. When the top tacky surface of cleanable insert portion 300 is dirtied to such an extent that the user desires to clean insert portion 300, in this embodiment, the user removes insert portion 300 from base portion 200 and cleans insert portion 300 to remove the accumulated debris. The insert portion 300 is then reinserted into base portion 200.

The tacky surface that is provided on the top side of cleanable insert portion 300 could be comprised of any of a variety of materials, such as polyvinyl chlorides combined with a suitable plasticizer, plasticized neoprene, polysulfides, and polyurethanes. Additionally, acrylics, such as butyl acrylate and many of its homologues, may be utilized. Again, the present invention is not limited to any particular material. The tacky surface may be formed, generally, from any adhesive material. The only consideration, in this embodiment, is that the surface should maintain its tacky characteristic even after repeated cleaning cycles.

The present invention is not limited to any particular methodology for cleaning insert portion 300. Insert portion 300 may be cleaned by any of a variety of methods depending upon a particular material composition for insert portion 300. For example, insert portion 300 may be cleaned by placing insert portion within a washing machine and washing insert portion 300 or insert portion 300 may be cleaned by scrubbing insert portion 300 with a scrub brush and soap and water or with a cleaning agent such as "Spic 'N Span".

Additionally, the insert portion 300 could be cleaned by utilizing a roller that also includes a tacky surface around the circumference of the roller. The tacky surface of the roller is comprised of a stronger adhesive than that of the tacky insert portion such that, as the tacky surface of the roller is rolled over the tacky surface of the insert  
5 portion, any dirt and debris on the tacky insert portion will be drawn off of the tacky insert portion and will adhere to the roller. In this manner, a roller with a tacky surface could be utilized to clean the tacky insert portion.

Again, however, the present invention is not limited to any particular methodology or cleaning agent for cleaning insert portion 300 and any cleaning  
10 methodology or agent compatible with the composition of insert portion 300 is contemplated.

Floor mat 100 may also include additional features for assisting in the cleaning of the soles of a person standing on floor mat 100. For example, base portion 200 and/or insert portion 300 may include an antibacterial composition and an antifungal  
15 composition. Antibacterial compositions such as anthraquinone derivatives of polyethylene glycol mono- and di-methacrylate could be utilized. Thus, floor mat 100 would be bacteriacidal. The antibacterial feature would be particularly desirable because the floor mat would be able to both clean structural debris from the soles of the person's shoes and remove any potentially harmful bacteria from the person's soles as  
20 well.

Additionally, in order to further provide for a desirable sole surface prior to entering a particular area, floor mat 100 could also be provided with a fragrance. Flavones such as tricyclic molecules with aromatic substitution or organic ethers, e.g., liminolic acid, could be utilized. The fragrance is transferred from floor mat 100 to the  
25 soles of the person's shoes such that any undesirable odors are favorably masked by the fragrance.

The present invention is not only limited to utilizing an antibacterial composition, an antifungal composition, and/or a fragrance in floor mat 100. Rather, floor mat 100 could also incorporate a variety of other substances that would assist in  
30 cleaning the soles of a person's shoes.

Any variety of structures or methods could be utilized for associating an

antibacterial composition, an antifungal composition, a fragrance, or any other composition, with floor mat 100. The substances could be applied as releasable, or dissipatable, coatings to floor mat 100 or could be releasably embedded as, for example, pellets within the structure of floor mat 100 such that as pressure is applied to floor mat  
5 100 the substances are dispensed to the soles of the person's shoes.

Figure 3 illustrates an alternative embodiment for floor mat 100. In Figure 3, it is illustrated that base portion 200 may include separate layers for a water dissipation component 230 and a cushioning component 240. Water dissipation component 230, in this embodiment, is disposed on a top side of the cushioning component 240.  
10 However, the present invention is not limited to this particular embodiment for water dissipation component 230 and cushioning component 240. For example, a single hybrid structure could be utilized for base portion 200 that would include the material properties to provide for both water dissipation and conforming structure.

Alternatively, Figure 4 illustrates that the floor mat may include both a water  
15 dissipation component, or wicking layer, and a water absorption layer. In Figure 4, floor mat 400 includes wicking layer 410 and water absorption layer 420. The wicking layer 410 could be comprised of polypropylene or olefins, or any other suitable material that has the properties of moving the water from the surface of floor mat 400. The water absorption layer 420 is disposed underneath the wicking layer 410 and absorbs  
20 any water that passes through the wicking layer 410. The water absorption layer 420 could be periodically removed and dried, such as by example only, in a drying machine.

Of course, a wicking layer 410 may be used either with or without a water absorption layer 420 and a cushioning layer, as described previously in other embodiments, and the water absorption layer 420 could be used with or without a  
25 wicking layer 410 and a cushioning layer. Additionally, both the wicking layer and/or the absorption layer and/or the cushioning layer could be used with or without a tacky portion.

Returning to Figure 3, Figure 3 also illustrates an alternative embodiment for insert portion 300. Whereas the previously disclosed embodiment for insert portion 300  
30 was discussed as a single structural member that could include a tacky surface on a top side thereof, the embodiment of Figure 3 for insert portion 300 is comprised of a



plurality of layers. As can be seen, layers 301-305, comprise insert portion 300. Each of the layers may include a tacky surface on a top side thereof, as was described previously for insert portion 300. In use, a top-most layer, e.g., layer 301, may be removed from its adjacent lower layer, e.g., layer 302, and may be independently  
5 cleaned. After cleaning, the layer may be reinstalled within recess 210 on top of the exposed layer of insert portion 300. In this manner, insert portion 300 may be cleaned by removing a top-most layer, cleaning that layer, and reinstalling that layer within recess 210. Whereas each layer is described as being independently cleanable, it is not required that each individual layer be cleanable. Each layer may be formed of materials  
10 as described previously when discussing the embodiment of Figures 1 and 2 for the insert portion.

Other alternative embodiments for insert portion 300 are contemplated. For example, whereas the previously disclosed embodiments discussed insert portion 300 as being comprised of one or more layers with a tacky surface on a top side of the  
15 layer(s), it is not required that insert portion 300 be formed with only a tacky surface on a top side thereof. More specifically, an alternative embodiment for insert portion 300 could include forming insert portion 300 as a single structural member from a material which is tacky in composition throughout the entire cross-section of the material. A material such as a blend of a noncross-linked hydrophilic thermoplastic, preferably a  
20 polyethylene glycol diacrylate with n not exceeding 15, and a hydrophobic material, such as a polyvinyl neoprene chloride, could be utilized for the insert portion of this embodiment. By forming insert portion 300 from a uniform, tacky material, the insert portion 300 does not necessarily have to be removed from recess 210 of base portion 200 to be cleaned. Insert portion 300 could be cleaned in this alternative embodiment  
25 by eroding the top surface of the insert portion as a result of use of the insert portion. Thus, by providing an erodible insert portion, the insert portion may be cleaned by the erosion of its top surface as the insert portion is used within floor mat 100.

As insert portion 300 erodes, the exposed surface of insert portion 300 continues to be tacky in composition because of its uniform cross-section. As the exposed tacky  
30 surface erodes, the dirt captured by the exposed tacky surface will dissipate as a result of the erosion and thus, the erosion of the insert portion itself provides for a cleanable

insert portion.

Alternatively, even with a uniform cross-section of a tacky substance for insert portion 300, the user may remove insert portion 300 from recess 210 and separately clean insert portion 300. Thus, the user is not required to rely solely on the erodible characteristic of insert portion 300 for cleaning of insert portion 300; rather, the user may utilize the erodible cleaning feature of the insert portion in combination with a separate cleaning step of removing the insert portion from the base portion and independently cleaning the insert portion.

As discussed above, insert portion 300 may be comprised of a variety of materials, including materials such as tacky plastics, paper, or adhesives that can be cleanable and may or may not be erodible and reusable. If paper is utilized, the insert portion may be formed as a single structural member or as a plurality of layers, as discussed previously. Additionally, the paper may include a tacky surface on a top-side thereof. The paper may be translucent, opaque, or colored, and may include a graphic display thereon.

As discussed earlier, it is desirable, but not required, that the floor mat contain a water dissipation and/or absorption capability. This capability is desired to help prevent the tacky surface of the insert portion from becoming excessively wet and, thus, slippery. Whereas it has been discussed that, in order to help prevent a user from slipping on the tacky surface of the insert portion, a water dissipation and/or absorbing capability could be included in the floor mat to reduce the degree of moisture on the tacky surface, this is not the only structure contemplated for preventing the tacky insert portion from becoming slippery. Alternatively, the tacky insert portion itself could be formed to help prevent slipping. Figures 5-12 illustrate alternative embodiments for tacky insert portion 300. Figure 5 illustrates tacky insert portion 300 as including a grid pattern 320 of channels 322 that could be comprised of a non-tacky material. The channels could be either raised from the surface of insert portion 300 or could lie coplanar with the top surface of the insert portion. By forming the channels of a non-tacky material, even if the tacky material of insert portion 300 became wet, a user would be assisted in not slipping on the slippery, wet tacky surface of the insert portion by the presence of the non-tacky surfaces which do not become slippery when wet.

Figures 6 and 7 illustrate another alternative embodiment for tacky insert portion 300 which includes anti-slip particles 324, e.g., silicon or sand particles, which extend above the top surface 330 of the tacky insert portion. It is desirable that the anti-slip particles be comprised of a material that does not become slippery when wet and that they be exposed from the tacky surface, however, it is not required. Even if the anti-slip particles are embedded within the tacky surface, their extension above the top surface 330 of the tacky insert portion will provide a physical frictional restraint against slipping for the soles of a person's shoes who is standing on the floor mat.

Whereas Figure 5 illustrates tacky insert portion 300 as including a grid pattern 320 of channels 322 that could be comprised of a non-tacky material and Figures 6 and 7 illustrate another alternative embodiment for tacky insert portion 300 which includes anti-slip particles 324 which extend above the top surface 330 of the tacky insert portion, it is not required that these two alternative embodiments contain features that are mutually exclusive. For example, it is contemplated that tacky insert portion 300 could include both a grid pattern of non-tacky channels and anti-slip particles, which is not illustrated specifically in the Figures but which can be easily understood.

Another alternative for providing a slip-resistant tacky portion is to include a plurality of anti-slip members, or treads or nipples, that extend up through and slightly above the surface of the tacky portion. As can be seen in Figure 8, in this embodiment, tacky portion 300 is inserted within a base portion, which may be a water absorbent border 500, and includes a plurality of apertures 342 within it. Each of a plurality of treads 344, which may extend upward from a base disposed underneath tacky portion 300, extend up through one of the plurality of apertures 342. A top-most end of each tread extends above a top-most surface 340 of tacky portion 300. As a person steps onto tacky portion 300, the quantity and positioning of the treads 344 is such that the tacky portion is able to remove debris from the person's shoes and the treads 344, at least one of which is stepped upon by the person, prevents slipping of the person on the tacky portion 300 should the tacky portion 300 become slippery when wet. The treads 344 may compress when stepped upon such that the top-most end of the tread is co-planar with the top-most surface 340 of the tacky portion 300. In this manner, the tread will contact the person's shoes to prevent slipping but yet not hinder contact between the

person's shoes and the tacky surface of the mat, which enhances the cleaning of the person's shoes. Therefore, there is a relationship between the distance that the tread extends above the top-most surface of the tacky portion and the compressibility of the tread; a relationship which provides the functionality discussed above.

5           The treads may be configured in any shape and size. Additionally, the treads may be comprised of any material which is slip-resistant when wet, such as, for example, rubber or plastics. The treads may include grooves within them to further assist in preventing a person from slipping on the tacky portion.

          Figures 9 and 10 illustrate additional alternative embodiments for both the tacky  
10   insert portion 300 and the base portion 200 that help to prevent slipping on a potentially wet tacky portion. As can be seen in Figure 9, and as discussed previously, tacky insert portion 300 is comprised of a plurality of layers 301, 302, and 303. Whereas only three layers are illustrated, it can be understood that any number of layers can be utilized in the present invention. As can be seen, tacky layers 301-303 each contain a plurality of  
15   integrally formed raised portions 300A. These raised portions can help to prevent a person from slipping on the tacky portion by providing increased friction between the top surface of the tacky layer, due to the raised portions, and the person's shoes. Thus, these raised portions can substantially reduce the potential for slipping on the tacky portion if it becomes wet.

20           The raised portion 300A can be formed in each layer in a variety of ways and the present invention is not limited to any particular method. One method for forming the raised portions is to assemble the layers into a pad of layers and then insert the entire pad into a machine press. One face of the press is flat and the other face, i.e., that face that is facing the non-tacky, or underside, of the layers, contains an array of bosses or  
25   bumps. When the pad is pressed in the machine press, all of the tacky layers become embossed with the pattern on the press face, causing the raised portions, or embossed portions, in each tacky layer of the pad. Thus, each embossed portion is integrally formed in each layer and is comprised of an indentation on the underside, or non-tacky side, of each layer and a raised portion on the upperside, or tacky side, of each layer.

30           As can be understood, in the method as described above for forming the raised portions, the raised portions of each layer are aligned with the raised portions of each

other layer. It is desirable, but not required, that the raised portions of each layer are aligned so that their shape may be easily maintained when the layers are stacked one upon another.

As can be seen in Figure 10, base portion 200 may also be formed to be complementary to the embossed layers. The surface 200A that defines a bottom of the recess of base portion 200, which receives within it the tacky layers 300, can be formed with raised portions 200B. These raised portions are positioned so that they are aligned with the raised portions in the tacky layers. Thus, the raised portions 200B on surface 200A are positioned within the indentations in the lower-most tacky layer when the layers are inserted into the recess in the base portion. As can be understood, these raised portions help to retain and maintain the raised portions in the tacky layer(s), particularly when only the lower-most layer(s) remain in the floor mat. However, it is not required that the base portion be formed with raised portions in practicing the present invention. The layers may be formed with raised portions whether or not the base portion includes complementary raised portions.

In another alternative embodiment for a tacky portion, the tacky portion could also include a water dissipating capability. The tacky portion could be comprised of a hydrophobic porous structure which would assist in dissipating water from the surface of the tacky portion.

Figures 11 and 12 illustrate alternative embodiments for the floor mat of the present invention that provide a water dissipating capability for the tacky portion. As will be discussed, the embodiment of Figure 11 also helps to prevent a person from slipping on a potentially wet tacky portion.

Figure 11 illustrates an embodiment for tacky portion 300 where the tacky layers 301 and 302 of the tacky portion define a plurality of apertures 300C therein. The apertures of each layer are aligned with the apertures of each other layer. Thus, because of the aligned apertures in the layers, the tacky portion is able to drain surface water from the top-most surface of the tacky portion, or from the soles of a person's shoes that is standing on the tacky portion, through the apertures and to the base portion, within which the layers may be positioned. The base portion, as discussed previously, may include a water dissipation component and/or a water absorbing component which

would move and/or absorb the surface water drained from the tacky portion through the apertures.

The apertures would also provide for helping to prevent slipping on a wet surface of the layers, not only by draining surface water from the surface, but by also providing for enhanced frictional contact between the shoes of the person stepping on the layer and the layer itself. The apertures provide for discontinuities in the surface of the layer which would enhance the frictional contact between the person's shoes and the layer. The edges of the surface of the layer which define the apertures would provide for this enhanced contact. The person's shoes would engage with the edges, thus enhancing frictional contact for the shoes. Additionally, the apertures would act as a suction on the bottoms of the person's shoes, e.g., like suction cups. This suction caused by the apertures on the person's shoes would also help to prevent slippage on the surface of the layer.

Figure 12 illustrates another embodiment for the floor mat of the present invention that also provides a water dissipating capability for the tacky portion. As can be seen, tacky portion 300 includes layers 301 and 302. Base portion 200 defines a recess where layers 301 and 302 are disposed within the recess. A surface of the base portion that defines a bottom of the recess includes a raised portion 200C at or near a center position within the recess. Thus, the raised portion 200C of the base portion forms a raised portion in each of the layers. As can be understood, the raised portion formed in the layers acts to dissipate surface water on the layers from the layers. The surface water will drain off of the layers under the force of gravity due to the raised portion.

Again, any number of layers may be included in tacky portion 300 in the embodiments of Figures 11 and 12.

It is also contemplated that a water absorbing powder, such as a talcum powder, could be provided in the present invention. The powder could either be integrated into the floor mat or be separately associated with the floor mat. The talcum powder would remove moisture from the soles of a person's shoes when the person stepped into the powder and the tacky insert portion could then remove the powder from the person's soles, in addition to any dirt on the soles, when the person next steps on the tacky insert



portion.

The present invention also provides an apparatus and method for determining when the tacky portion, or a layer in the tacky portion, should be removed for cleaning. Since the tacky portion assists in removing dirt from the soles of the person's shoes that steps on the tacky portion, the tacky portion, or a layer thereof, will become dirty after some number of persons step on the it, assuming that any particular person's shoes are not exceptionally dirty. Therefore, it would be desirable to assist a person in deciding when to remove a dirty tacky portion for cleaning. Again, as discussed above, this determination can be made after a certain number of persons step on the mat. Thus, an embodiment of the present invention as illustrated in Figure 13 includes a sensor system 700 that detects the presence of a person on the floor mat 100. The sensor system 700 may detect the presence of a person on base portion 200 and/or tacky portion 300. Since it is assumed that a person who steps on base portion 200 will also step on tacky portion 300, sensing the person's presence on either portion is sufficient for practicing the present invention.

Sensor system 700 includes a sensor 710 and a display device 720, e.g., an LED, coupled to sensor 710 and disposed on mat 100 such that it can be viewed. A power source, such as a battery, may be included on an underside of the floor mat. As mentioned above, sensor 710 senses the presence of a person on mat 100, e.g., in this embodiment on tacky portion 300. The sensor can detect the person's presence by utilizing any of a variety of apparatuses and methods and can include sensing the pressure applied to the mat by the weight of the person standing on the mat or by sensing the motion across the surface of the mat by the movements of the person. Thus, pressure sensors and motion detectors may be utilized in the present invention. Sensor system 700 also determines the number of persons that have stepped on the mat 100 by counting the number of sensed presences. After the number of presences equals a defined number of presences, a signal is provided to display device 720, e.g., illuminating the LED, which indicates that the tacky portion should be removed for cleaning. The present invention is not limited to removing the tacky portion at any particular number of sensed presences and the number may be adjusted based on the particular environmental conditions in which the mat is utilized. Of course, as can be

understood, after the dirty tacky portion or layer is removed and/or cleaned the sensor system can be reset to begin counting the total number of presences on the newly cleaned or exposed layer.

Alarm device 720 can provide either a visual, audible, or vibratory signal and the present invention is not limited to providing any particular type of signal. For example, a visual signal could consist of a light that is illuminated when the floor mat should be cleaned and that is not illuminated when the floor mat does not require cleaning. Alternatively, the light could be continuously illuminated in one of a plurality of different colors, with each color signifying a different state of cleanliness for the floor mat. For example, a green light could signify that the mat does not need cleaning. A yellow light could indicate the mat is reaching a state of dirtiness that will soon require cleaning. A red light, which could blink on and off, could signify that it is time to clean the floor mat.

The sensor system of the present invention may be utilized with any of the embodiments disclosed for the cleanable portion, which may or may not be an insert and may or may not include layers and a tacky surface(s), and the base portion.

Whereas cleanable portion 300 has been discussed as an insert portion, it is not required that cleanable portion 300 be inserted into floor mat 100. There exists many alternative possibilities for associating cleanable portion 300 with floor mat 100. For example, cleanable portion 300 could be placed on top of base portion 200 or could be positioned adjacent to base portion 200. The present invention is not limited to inserting any of the embodiments for cleanable portion 300 within base portion 200.

For example, Figure 14 illustrates a tacky portion 300 and a non-tacky portion 200, which may include a water dissipation component, a water absorbing component, and a cushioning component, as discussed previously, that are separable. As can be seen in Figure 14, tacky portion 300 may be bordered within a border 500, which may be water absorbent, water dissipative, and include a cushioning component, and may include a plurality of apertures 342 and treads 344 within it. Tacky portion 300 can include any of the embodiments previously discussed. An attachment layer 600 is positioned on an underside of both border 500 of tacky portion 300 and non-tacky portion 200. The border 500 and/or non-tacky portion 200 may be releasably attached



to attachment layer 600. Thus, through attachment layer 600, border 500, and therefore tacky portion 300, and non-tacky portion 200 are releasably attachable to each other. In this manner, it is possible to, for example, position non-tacky portion 200 outside of a person's home on the front porch and tacky portion 300 within the person's home.

5 Attachment layer 600 can be any of a variety of materials. All that is required is that the attachment layer be able to releasably join one portion of the floor mat to a second portion of the floor mat. For example, a hook and loop fastener assembly, e.g., Velcro®, can be used with one portion of the assembly on the attachment layer and the other portion on the underside of the first portion of the floor mat and the second portion  
10 of the floor mat. Alternatively, an adhesive can be utilized to releasably join the two portions of the floor mat to the attachment layer. Additionally, snaps, including any type of male/female connector, may be used to join the two portions to the attachment layer.

Figure 15 illustrates a first process step in utilizing an embodiment of the floor  
15 mat 100 of the present invention. As was described previously, an embodiment of floor mat 100 includes a base portion 200 and an insert portion 300. As can be seen in Figure 15, and as was also discussed previously, a different graphic display 220 is present in the embodiment of Figure 15 than was illustrated in the embodiment of Figures 1 and 2. Thus, Figure 15 displays a "Hello" message with "smiley face" representations in the  
20 graphic 220.

As can be seen in Figure 15, in utilizing an embodiment of the present invention, a user would first step upon base portion 200. As discussed earlier, base portion 200 may include a water dissipating and/or absorbing component and is thus able to assist in removing any moisture from the soles of the person's shoes. As was also discussed  
25 earlier, because base portion 200, in one embodiment, also includes a cushioning component, base portion 200 conforms to the person's soles when the person steps upon base portion 200. Whereas not illustrated in Figure 15, as discussed previously, an antibacterial composition, an antifungal composition, a fragrance, or any other cleaning substance may also be associated with floor mat 100 and applied to the soles of the  
30 person's shoes when the person applies pressure to floor mat 100.

As can be seen in Figure 16, the second process step in utilizing the present

invention includes the person stepping onto insert portion 300 of floor mat 100. As discussed previously, insert portion 300 may include a tacky surface on a top side thereof for assisting in removing debris from the soles of the person's shoes. Additionally, antibacterial compositions, antifungal compositions, fragrances, or other  
5 cleaning compositions may also be included within insert portion 300 for dispensing to the soles of the person's shoes.

After the person steps onto insert portion 300, the user then steps off of floor mat 100. As described previously, floor mat 100 may be cleaned after an accumulation of dirt on insert portion 300 by any of the methods described previously. Insert portion  
10 300 may be removed from base portion 200 and cleaned, a layer may be removed from insert portion 300 to be cleaned or discarded, or insert portion 300 may be cleaned through erosion of insert portion 300. The present invention is not limited to any particular methodology for cleaning insert portion 300 of floor mat 100.

Figures 17-22 illustrate further alternative embodiments for the floor mat of the  
15 present invention. As can be seen in Figure 17, in this embodiment for the floor mat, floor mat 1700 includes a cleanable portion 1710 and a plurality of base portions 1720A-D. As can be seen, cleanable portion 1710 is positioned within one of base portions 1720A-D. In this manner, the floor mat 1700 can be customized for a particular user by interchanging the cleanable portion 1710 with one of a variety of base  
20 portions 1720A-D. The base portions 1720A-D can be formed in any of a variety of physical configurations and can include any of a variety of themes, graphics, or colors. Thus, a common cleanable portion 1710 may be utilized with a variety of base portions 1720A-D.

Figures 18-20 illustrate another alternative embodiment for a floor mat 1800 in  
25 accordance with the principles of the present invention. As can be seen in Figure 18, floor mat 1800 also includes a cleanable portion 1810 and a base portion 1820. As discussed previously, cleanable portion 1810 is received within base portion 1820. In this embodiment, cleanable portion 1810 is comprised of a single sheet 1810A. The single sheet 1810A may be tacky on a top-side thereof and may include apertures  
30 therein to receive anti-slip nipples though it, as was also discussed previously. The single sheet 1810A, in this embodiment, may be removed and replaced with another

sheet when dirty.

Figure 19 illustrates that a plurality of sheets 1810B-D, may be attached to each other and rolled into a roll 1830 of sheets. The sheets can be joined to each other at a perforated joint to provide for ease in separating a sheet from the roll of sheets. As can be understood, a sheet may be separated from the roll of remaining sheets and may be then inserted into base portion 1820.

Figure 20 illustrates that the roll of sheets 1830 may be stored in a storage device 1840, such as, for example, by mounting the roll of sheets 1830 on a cabinet door, which may be located in proximity to the floor mat. In this manner, replacements sheets are easily organized and stored for use.

Alternatively, instead of organizing the sheets in a roll and storing the roll in a cabinet, the sheets could be folder one upon another such that they form a flat package. The package of sheets could then be stored underneath of the floor mat 1800 where individual sheets could be removed from the package and from under the floor mat, when needed, similar to the way a Kleenex® tissue is dispensed.

Figure 21 illustrates another alternative embodiment for a floor mat in accordance with the present invention. Floor mat 2100 also includes a cleanable/scrapable portion 2110 and a base portion 2120. In this embodiment, cleanable portion 2110 is formed, as discussed previously in this application, as a single structural member from a material which is tacky in composition throughout the entire cross-section of the material. As was also discussed previously, by forming portion 2110 from a uniform, tacky material, the portion 2110 does not necessarily have to be removed from the base portion 2120 to be cleaned. However, in the embodiment previously discussed, the cleanable portion 2110 could be cleaned by eroding the top surface of the insert portion as a result of use of the insert portion. In the embodiment of Figure 21, the cleanable portion is cleaned by scraping off a top surface of approximately 2-3 microns from the cleanable portion 2110 by utilizing a scraper 2130.

Scraper 2130 can include any of a variety of structures, however, all that is required is that the scraper be capable of removing a top surface from cleanable portion 2110. For example, any type of scraping surface can be utilized in scraper 2130, such as, for example, a dull knife, a razor, or a plane.

Scraper 2130 is movable on tracks 2140, 2145. Tracks 2140, 2145 are adjacent to cleanable portion 2110 and base portion 2120. Scraper 2130 may include wheels or other structures, e.g., pins, which are received within complementary structures, e.g., grooves, in tracks 2140, 2145. Thus, scraper 2130 is movable across cleanable portion 2110 on tracks 2140, 2145. The scraper 2130 may only include a scraping surface on the portion of scraper 2130 that is movable across cleanable portion 2110. Additionally, it is not required that two tracks be utilized. The scraper could be movable within a single track.

Scraper 2130 may be moved by any of a variety of methods, including using the foot of a user to engage with the scraper to move the scraper on the tracks.

Floor mat 2100 also includes a catch basin 2150 that may be included at one or both ends of tracks 2140, 2145. Catch basin(s) 2150 includes a recess into which is deposited the shavings from cleanable portion 2110 after scraper 2130 scrapes the cleanable portion. Scraper 2130 moves the shavings off of the cleanable portion and into the catch basin 2150. The shavings from the cleanable portion deposited into the catch basin may be removed from the catch basin in any of a variety of ways, including, for example, by vacuuming the shavings from the catch basin or removing a detachable catch basin, throwing away the contents from the catch basin, and reinstalling the catch basin.

As can be understood, as the cleanable portion is shaved, the scraper is commensurately lowered on tracks 2140, 2145 such that the surface of the scraper that engages with the cleanable portion remains engaged with the cleanable portion. As such, for example, the scraper may be mounted on a ratchet mechanism such that, as the scraper is moved across a complete width of the floor mat, the scraper actuates the ratchet such that the ratchet lowers the scraper. Alternatively, the scraper could remain in the same relative position with respect to the tracks and the tracks could be ratcheted lower with respect to the base portion and cleanable portion. Additionally, the blade surface of the scraper could be lowered with respect to the scraper's structure such that the blade is moved relative to the cleanable portion and the base portion but the scraper remains in the same relative position with respect to the tracks and the cleanable portion and the base portion.

Additionally, it is not required that a base portion be utilized in the embodiment for floor mat 2100. The cleanable portion alone can be utilized with the tracks adjacent the cleanable portion and the scraper movable on the tracks. A catch basin(s) could still be utilized. As such, Figure 22 illustrates an embodiment for floor mat 2200 that includes a cleanable portion 2210 without use of a base portion. Cleanable portion 2210 is adjacent to tracks 2240, 2245. Scraper 2230 is movable on tracks 2240, 2245. A catch basin 2250 may be included at one or both ends of tracks 2240, 2245.

All of the disclosed embodiments are illustrative of the various ways in which the present invention may be practiced. Additionally, any of the disclosed embodiments for the base portion and the cleanable portion, and thus all of the features associated with these components, may be combined in any embodiment of the present invention and the present invention is not limited to only the particular combined embodiments disclosed. Other embodiments can be implemented by those skilled in the art without departing from the spirit and scope of the present invention.

**What Is Claimed Is:**

- 1           1.       A floor mat, comprising:  
2               a base portion having a non-tacky surface and adapted for receiving the soles of  
3       a person's shoes thereon; and  
4               a cleanable portion associated with said base portion having a tacky surface for  
5       receiving the soles of the shoes thereon.
  
- 1           2.       The floor mat of claim 1 wherein said base portion includes a water  
2       absorbing component.
  
- 1           3.       The floor mat of claim 1 wherein said base portion includes a cushioning  
2       component wherein when the person's shoes applies pressure to said base portion said  
3       base portion conforms to a topography of a bottom of the person's shoes.
  
- 1           4.       The floor mat of claim 3 wherein when the person's shoes applies  
2       pressure to said cleanable portion said cleanable portion conforms to the topography of  
3       the bottom of the person's shoes.
  
- 1           5.       The floor mat of claim 1 wherein at least one of said base portion and  
2       said cleanable portion includes graphics.
  
- 1           6.       The floor mat of claim 5 wherein said graphics may be modified.
  
- 1           7.       The floor mat of claim 5 wherein said base portion includes a recess  
2       therein and wherein said cleanable portion is removably received within said recess and  
3       also wherein said graphics are included within said recess and said cleanable portion is  
4       comprised of a transparent material.
  
- 1           8.       The floor mat of claim 1 wherein said base portion includes a recess  
2       therein and wherein said cleanable portion is removably received within said recess.

1           9.       The floor mat of claim 1 wherein said cleanable portion includes a tacky  
2 surface on a bottom side of said cleanable portion.

1           10.      The floor mat of claim 1 wherein said cleanable portion is comprised of  
2 a tacky material and wherein said cleanable portion is cleanable by eroding a top surface  
3 of said tacky material through use of the floor mat.

1           11.      The floor mat of claim 1 wherein said cleanable portion includes a  
2 plurality of cleanable reusable layers.

1           12.      The floor mat of claim 1 wherein at least one of said base portion and  
2 said cleanable portion includes a fragrance.

1           13.      The floor mat of claim 1 wherein at least one of said base portion and  
2 said cleanable portion includes an antibacterial composition.

1           14.      The floor mat of claim 1 wherein at least one of said base portion and  
2 said cleanable portion is bacteriacidal.

1           15.      The floor mat of claim 1 wherein said cleanable portion is adapted to be  
2 removably associated with said base portion.

1           16.      A method for cleaning a floor mat comprising the step of cleaning a  
2 cleanable portion that is associated with a base portion wherein said cleanable portion  
3 includes a tacky surface thereon and said cleanable portion is adapted for receiving a  
4 sole of a person's shoe thereon and wherein said base portion includes a non-tacky  
5 surface and is adapted for receiving the sole of the person's shoe thereon.

1           17.      The method of claim 16 wherein said step of cleaning said cleanable  
2 portion includes the steps of:  
3           removing said cleanable portion from said base portion;

- 4 cleaning said cleanable portion; and  
5 re-inserting said cleanable portion within said base portion.

1 18. The method of claim 16 wherein said step of cleaning said cleanable  
2 portion includes the step of eroding said cleanable portion.

1 19. The method of claim 16 wherein said step of cleaning said cleanable  
2 portion includes the step of rolling an adhesive included on a roller across said tacky  
3 surface of said cleanable portion.

1 20. The method of claim 16 wherein said base portion includes a water  
2 absorbing component.

1 21. The method of claim 16 wherein said base portion includes a cushioning  
2 component wherein when the person's shoe applies pressure to said base portion said  
3 base portion conforms to a topography of a bottom of the person's shoe.

1 22. The method of claim 21 wherein when the person's shoe applies pressure  
2 to said cleanable portion said cleanable portion conforms to the topography of the  
3 bottom of the person's shoe.

1 23. The method of claim 16 wherein at least one of said base portion and  
2 said cleanable portion includes graphics.

1 24. The method of claim 23 wherein said graphics may be modified.

1 25. The method of claim 23 wherein said base portion includes a recess  
2 therein and wherein said cleanable portion is removably received within said recess and  
3 also wherein said graphics are included within said recess and said cleanable portion is  
4 comprised of a transparent material.





1           26.     The method of claim 16 wherein at least one of said base portion and  
2     said insert portion includes a fragrance.

1           27.     The method of claim 16 wherein at least one of said base portion and  
2     said cleanable portion includes an antibacterial composition.

1           28.     The method of claim 16 wherein at least one of said base portion and  
2     said cleanable portion includes an antifungal composition.

1           29.     The method of claim 16 wherein at least one of said base portion and  
2     said cleanable portion is bacteriacidal.

1           30.     An apparatus for cleaning a person's shoes comprising a floor mat  
2     having a modifiable graphic display.

1           31.     The apparatus of claim 30 wherein said graphic display is modifiable in  
2     an intensity of a color that is included in said graphic display.

1           32.     The apparatus of claim 30 wherein said graphic display is modifiable in  
2     a textual message that is included in said graphic display.

1           33.     The apparatus of claim 30 wherein said graphic display is modifiable in  
2     a pictorial representation that is included in said graphic display.

1           34.     The apparatus of claim 30 wherein said graphic display includes a liquid  
2     crystal display connected to a computer.

1           35.     The apparatus of claim 30 wherein said floor mat includes a tacky  
2     surface.

1           36.     The apparatus of claim 30 wherein said graphic display is modifiable by

2 an owner of said floor mat.

1 37. An apparatus for cleaning a person's shoes comprising a floor mat  
2 having an antibacterial composition associated with said floor mat.

1 38. The apparatus of claim 37 wherein said antibacterial composition is  
2 releasably embedded within said floor mat.

1 39. The apparatus of claim 37 wherein said antibacterial composition is  
2 releasably coated on said floor mat.

1 40. An apparatus for cleaning a person's shoes comprising a floor mat  
2 having a fragrance associated with said floor mat.

1 41. The apparatus of claim 40 wherein said fragrance is releasably embedded  
2 within said floor mat.

1 42. The apparatus of claim 40 wherein said fragrance is releasably coated on  
2 said floor mat.

1 43. A floor mat having a shoe receiving surface that includes a first tacky  
2 portion and a second water absorbing portion wherein both of said first and second  
3 portions are adapted to receive a sole of a person's shoe thereon.

1 44. A floor mat having a shoe receiving surface that includes a first tacky  
2 portion and a second non-tacky portion wherein both of said first and second portions  
3 are adapted to receive a sole of a person's shoe thereon.

1 45. The floor mat of claim 44 wherein said first tacky portion includes anti-  
2 slip particles extending above a top surface of the tacky portion.



1           46.     The floor mat of claim 44 wherein said first tacky portion includes a grid  
2     pattern of channels comprised of a non-tacky material.

1           47.     The floor mat of claim 44 wherein said first tacky portion includes a  
2     hydrophobic porous structure and wherein said hydrophobic porous structure dissipates  
3     water from a top surface of said first tacky portion.

1           48.     A floor mat, comprising:  
2             a water dissipating base portion having a non-tacky surface and adapted for  
3     receiving the soles of a person's shoes thereon; and  
4             a cleanable portion having a tacky surface adapted for receiving the soles of the  
5     person's shoes thereon and adapted to be removably associated with said base portion;  
6             wherein at least one of said base portion and said cleanable portion includes a  
7     fragrance, an antibacterial composition, an antifungal composition, a cushioning  
8     component, and a modifiable graphic display.

1           49.     A floor mat, comprising:  
2             a non-tacky base portion adapted for receiving the soles of a person's shoes  
3     thereon; and  
4             a cleanable portion having a tacky surface adapted for receiving the soles of the  
5     person's shoes thereon and adapted to be removably associated with said base portion;  
6             wherein at least one of said base portion and said cleanable portion includes a  
7     fragrance, an antibacterial composition, an antifungal composition, a cushioning  
8     component, and a modifiable graphic display.

1           50.     An apparatus for cleaning a person's shoes comprising a floor mat  
2     having a tacky surface that is slip-resistant when wet.

1           51.     The apparatus of claim 50 wherein said tacky surface includes a grid  
2     pattern of a plurality of channels comprised of a non-tacky material.

1           52.     The apparatus of claim 50 wherein said tacky surface includes anti-slip  
2 particles.

1           53.     A tacky surface for cleaning a person's shoes that is slip-resistant when  
2 wet.

1           54.     A tacky mat for cleaning a person's shoes that has a slip-resistant feature  
2 associated with it for reducing slippage when wet.

1           55.     A floor mat with an electronic display associated with it.

1           56.     The floor mat of claim 55 wherein said electronics display is an LCD.

1           57.     A floor mat having a modifiable graphic display that includes electric  
2 paper.

1           58.     A floor mat having a modifiable graphic display that includes light  
2 emitting polymers.

1           59.     The floor mat of claim 58 wherein said light emitting polymers are  
2 woven into said floor mat.

1           60.     The floor mat of claim 58 wherein said light emitting polymers are  
2 attached to said floor mat.

1           61.     A floor mat having a modifiable graphic display that includes electronic  
2 ink.

1           62.     A floor mat, comprising:  
2 a tacky surface including a plurality of apertures therein; and  
3 a non-tacky surface disposed below said tacky surface and including a plurality

1 of anti-slip members wherein said anti-slip members are disposed through said plurality  
2 of apertures.

1 63. The floor mat of claim 62 wherein said anti-slip members are rubber  
2 treads.

1 64. The floor mat of claim 62 wherein said anti-slip members extend above  
2 said tacky surface.

1 65. A floor mat, comprising:  
2 a wicking portion; and  
3 a water absorbing portion, said water absorbing portion disposed below said  
4 wicking portion.

1 66. The floor mat of claim 65 further comprising a tacky portion, said tacky  
2 portion releasably attachable to said wicking portion and said water absorbing portion.

1 67. A floor mat, comprising:  
2 a wicking portion; and  
3 a tacky portion releasably attachable to said wicking portion.

1 68. The floor mat of claim 67 further comprising a water absorption portion  
2 disposed below said wicking portion.

1 69. A floor mat comprising:  
2 a tacky portion; and  
3 a non-tacky portion releasably attachable to said tacky portion.

1 70. The floor mat of claim 69 further comprising an attachment layer  
2 disposed on, and releasably attachable to, an underside of said tacky portion and said  
3 non-tacky portion.

1           71.     The floor mat of claim 70 wherein said attachment layer is one  
2     component of a hook and loop fastener assembly.

1           72.     The floor mat of claim 69 wherein said non-tacky portion includes a  
2     wicking portion.

1           73.     The floor mat of claim 72 wherein said non-tacky portion includes a  
2     water absorbing portion disposed under said wicking portion.

1           74.     The floor mat of claim 69 wherein said non-tacky portion includes a  
2     modifiable graphic display.

1           75.     The floor mat of claim 70 wherein said tacky portion and said non-tacky  
2     portion are attachable to said attachment layer by utilizing a snap.

1           76.     A floor mat having a scrollable modifiable electronic display.

1           77.     A floor mat comprising a plurality of layers wherein each of said  
2     plurality of layers contains a plurality of embossed portions, said plurality of embossed  
3     portions of a layer of said plurality of layers being aligned with said plurality of  
4     embossed portions of each other layer of said plurality of layers.

1           78.     The floor mat of claim 77 wherein each of said plurality of embossed  
2     portions of each of said plurality of layers comprises an indentation on an underside of  
3     said layer and a raised portion on an upperside of said layer, said indentation and said  
4     raised portion aligned with each other.

1           79.     The floor mat of claim 77 further comprising a base portion defining a  
2     recess, said plurality of layers disposed within said recess and wherein a surface of said  
3     base portion that defines a bottom of said recess includes a plurality of raised portions,

4 said plurality of raised portions aligned with said plurality of embossed portions of said  
5 plurality of layers.

1 80. The floor mat of claim 78 further comprising a base portion defining a  
2 recess, said plurality of layers disposed within said recess and wherein a surface of said  
3 base portion that defines a bottom of said recess includes a plurality of raised portions,  
4 said plurality of raised portions aligned with said indentations on said underside of a  
5 lower-most layer of said plurality of layers.

1 81. The floor mat of claim 77 wherein each of said plurality of layers is  
2 tacky on a top side thereof.

1 82. The floor mat of claim 80 further comprising a sensor system coupled  
2 to either of said plurality of layers or said base portion.

1 83. A floor mat comprising a plurality of layers wherein each of said  
2 plurality of layers includes a plurality of integrally formed raised portions, said plurality  
3 of integrally formed raised portions of a layer of said plurality of layers being aligned  
4 with said plurality of integrally formed raised portions of each other layer of said  
5 plurality of layers.

1 84. The floor mat of claim 83 further comprising a base portion defining a  
2 recess, said plurality of layers disposed within said recess and wherein a surface of said  
3 base portion that defines a bottom of said recess includes a plurality of raised portions,  
4 said plurality of raised portions of said base portion aligned with said plurality of raised  
5 portions of said plurality of layers.

1 85. The floor mat of claim 84 wherein each of said plurality of layers is  
2 tacky on a top side thereof.

1 86. The floor mat of claim 84 further comprising a sensor system coupled

2 to either of said plurality of layers or said base portion.

1 87. A method for making a floor mat, the floor mat including a plurality of  
2 layers, comprising embossing each of said plurality of layers to form a plurality of  
3 integrally formed raised portions thereon, said plurality of integrally formed raised  
4 portions of a layer of said plurality of layers being aligned with said plurality of  
5 integrally formed raised portions of each other layer of said plurality of layers.

1 88. The method of claim 87 further comprising disposing said plurality of  
2 layers in a base portion including a plurality of raised portions, said plurality of raised  
3 portions of said base portion aligned with said plurality of integrally formed portions  
4 of said plurality of layers.

1 89. The method of claim 87 wherein each of said plurality of layers is tacky  
2 on a top side thereof.

1 90. A floor mat comprising a plurality of layers wherein each of said  
2 plurality of layers defines a plurality of apertures therein, said plurality of apertures of  
3 a layer of said plurality of layers being aligned with said plurality of apertures of each  
4 other layer of said plurality of layers.

1 91. The floor mat of claim 90 wherein each of said plurality of layers is  
2 tacky on a top side thereof.

1 92. The floor mat of claim 90 further comprising a base portion defining a  
2 recess, said plurality of layers disposed within said recess

1 93. The floor mat of claim 92 further comprising a sensor system coupled  
2 to either of said plurality of layers or said base portion.

1 94. A floor mat, comprising:



2 a plurality of layers; and  
3 a base portion defining a recess, said plurality of layers disposed within said  
4 recess and wherein a surface of said base portion that defines a bottom of said recess  
5 includes a raised portion, said raised portion of said base portion forming a raised  
6 portion in each of said plurality of layers.

1 95. The floor mat of claim 94 wherein each of said plurality of layers is  
2 tacky on a top side thereof.

1 96. The floor mat of claim 95 further comprising a sensor system coupled  
2 to either of said plurality of layers or said base portion.

1 97. A floor mat, comprising:  
2 a tacky portion;  
3 a base portion defining a recess, said tacky portion disposed within said recess;  
4 and  
5 a sensor coupled to either of said tacky portion or said base portion.

1 98. The floor mat of claim 97 wherein said sensor is a pressure sensor.

1 99. The floor mat of claim 97 wherein said sensor is a motion detector.

1 100. The floor mat of claim 97 further comprising a display device coupled  
2 to said sensor.

1 101. The floor mat of claim 100 wherein said display device is an LED.

1 102. A method of cleaning a floor mat, comprising the steps of:  
2 sensing a presence of a person on the floor mat;  
3 determining a number of persons that have stepped on the floor mat responsive  
4 to said sensing step; and

5 removing a cleanable portion of the floor mat from the floor mat after the  
6 number of persons equals a defined number of persons.

1 103. The method of claim 102 wherein the sensing step includes sensing a  
2 pressure applied to the floor mat.

1 104. The method of claim 102 wherein the sensing step includes sensing a  
2 motion across the floor mat.

1 105. The method of claim 102 further comprising the step of providing an  
2 indication on a display device when the defined number of persons is equaled.

1 106. The method of claim 105 wherein said indication includes illumination  
2 of an LED.

1 107. The method of claim 102 wherein the cleanable portion is tacky on a  
2 topside thereof.

1 108. The method of claim 107 wherein the cleanable portion includes a  
2 plurality of layers wherein each of said plurality of layers is tacky on a top-side thereof.

1 109. A floor mat comprising:  
2 an insert portion; and  
3 a plurality of base portions wherein each of said plurality of base portions  
4 include a recess, said insert portion positionable within one of said recesses of said  
5 plurality of base portions, and wherein each of said plurality of base portions is  
6 configured differently from each other plurality of base portions.

1 110. The floor mat of claim 109 wherein said insert portion includes a tacky  
2 surface on a topside thereof.

1           111.    A floor mat comprising:  
2           an insert portion; and  
3           a base portion defining a recess within, said insert portion disposed within said  
4 recess;  
5           wherein said insert portion is one of a plurality of sheets and wherein each of  
6 said plurality of sheets are detachably attached to at least one other of said plurality of  
7 sheets and wherein a remaining number of said plurality of sheets separate from said  
8 insert portion are stored separate from said recess of said base portion.

1           112.    The floor mat of claim 111 wherein said remaining number of said  
2 plurality of sheets are formed in a roll.

1           113.    The floor mat of claim 111 wherein said remaining number of said  
2 plurality of sheets are folded one upon another in a flat configuration and wherein said  
3 remaining number of said plurality of sheets are stored on an underside of said base  
4 portion.

1           114.    A floor mat comprising:  
2           a tacky portion;  
3           a track adjacent to said tacky portion; and  
4           a scraper movable within said track and engageable with said tacky portion.

1           115.    The floor mat of claim 114 further comprising a base portion, said tacky  
2 portion disposed within said base portion.

1           116.    The floor mat of claim 114 further comprising a catch basin attached to  
2 an end of said track.

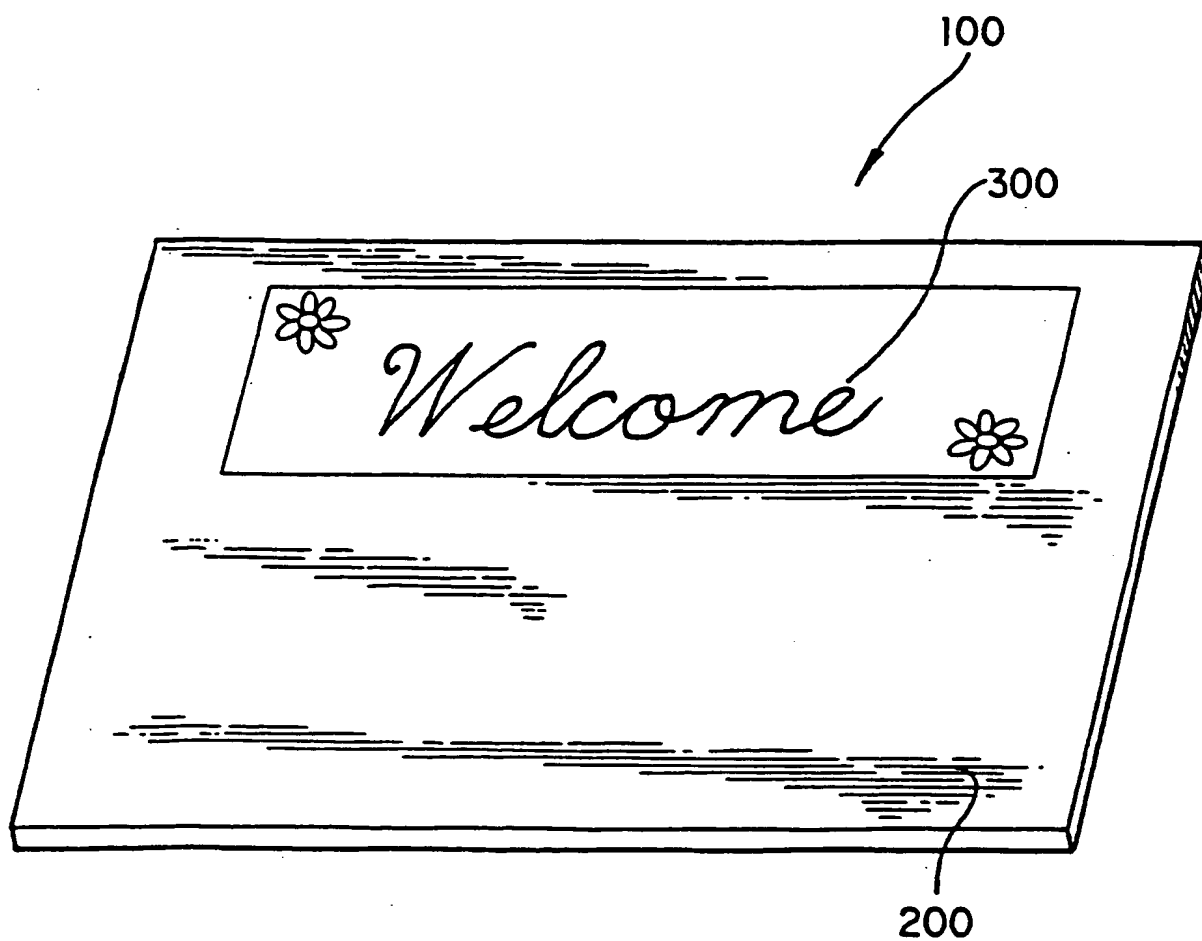


FIG. 1

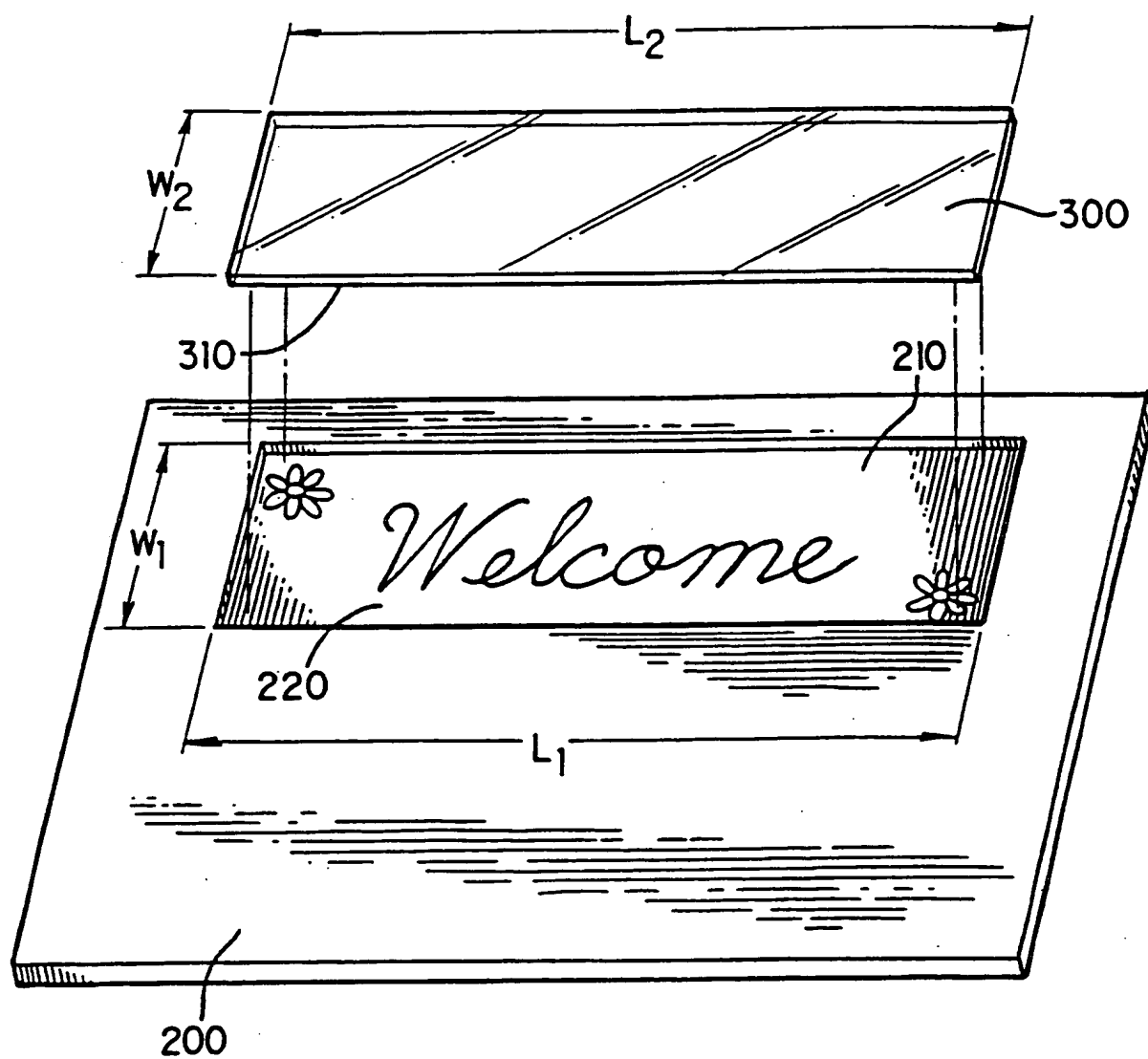


FIG. 2

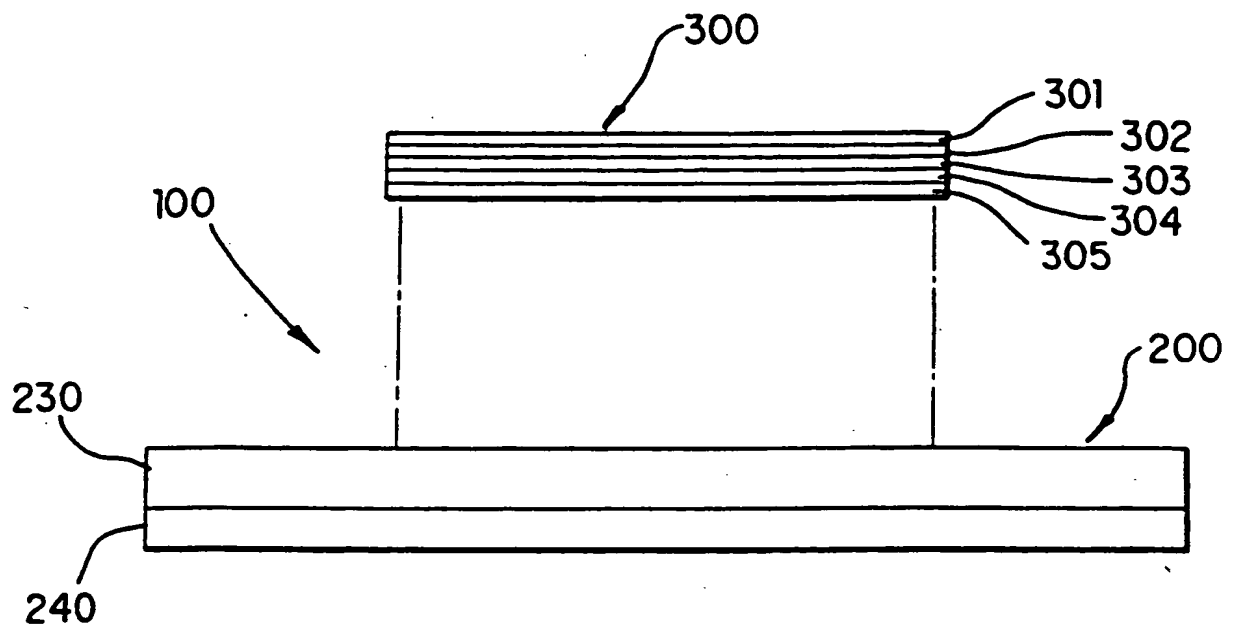


FIG. 3

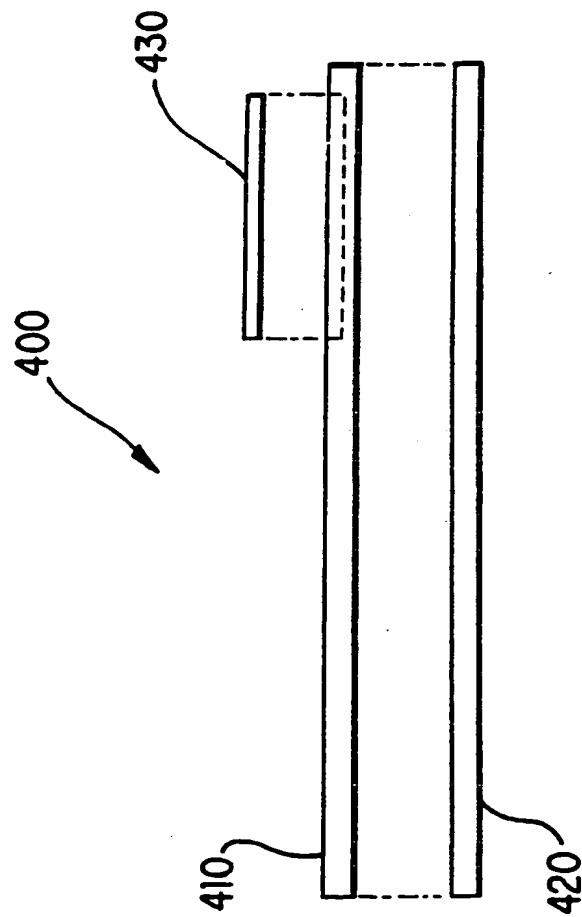


FIG. 4

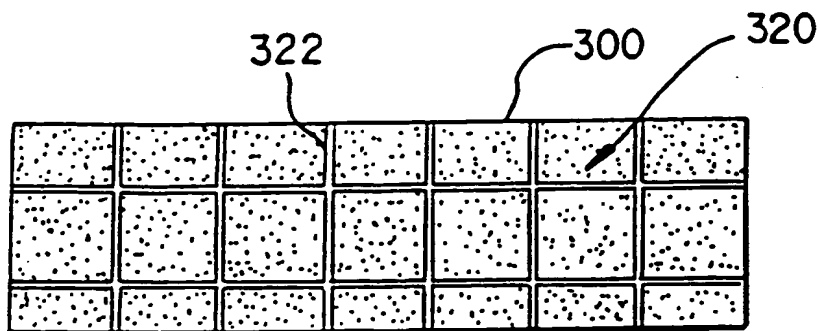


FIG. 5

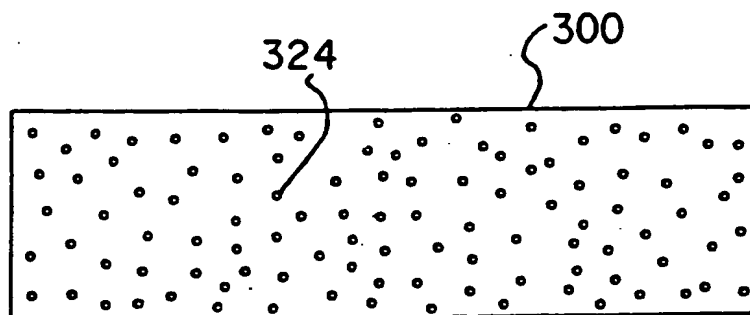


FIG. 6

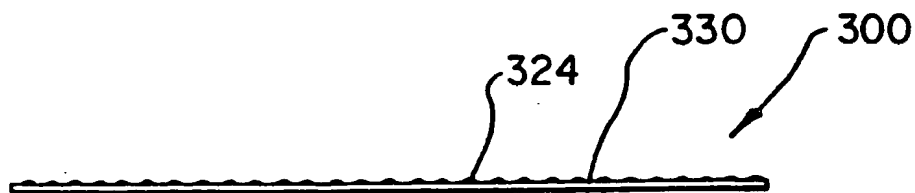
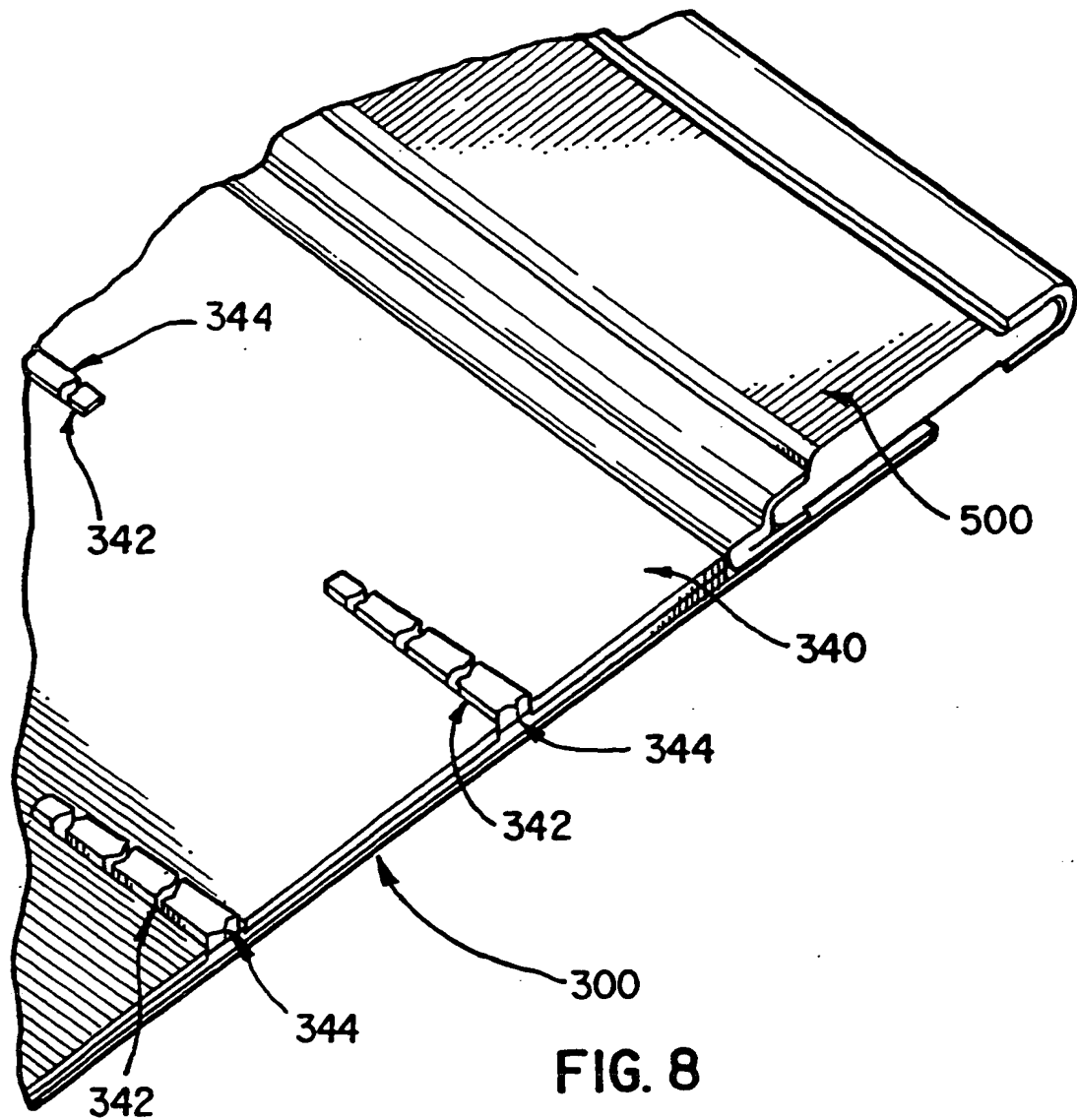


FIG. 7





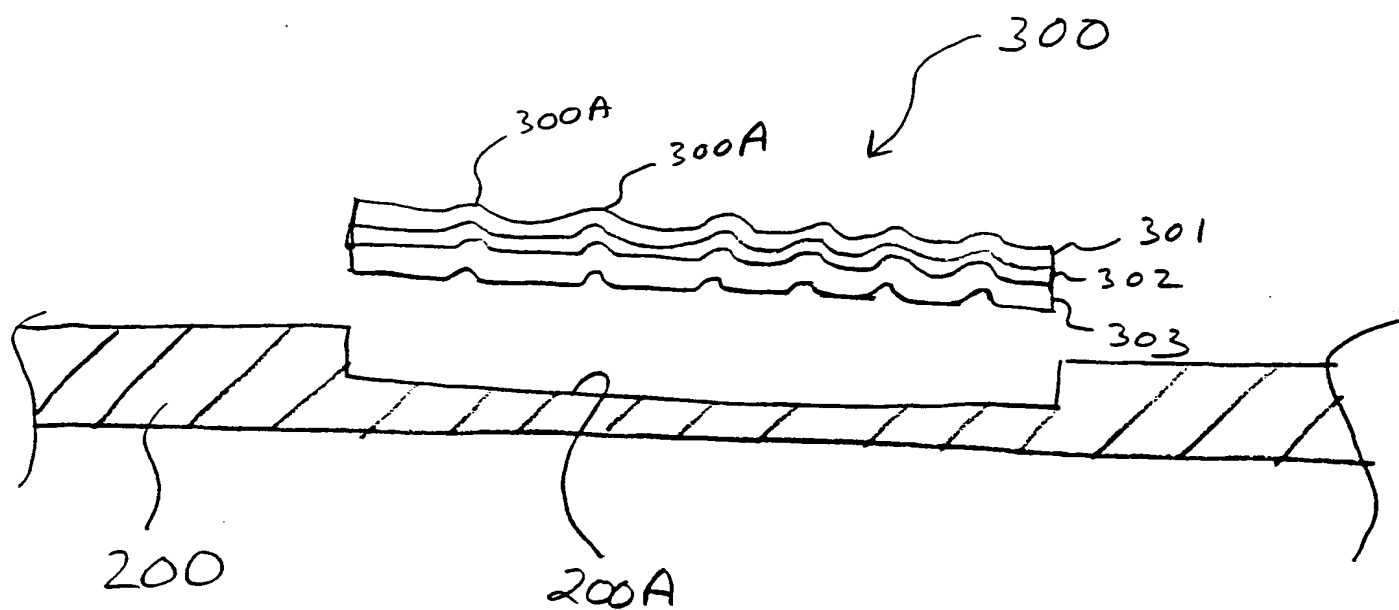


FIG. 9

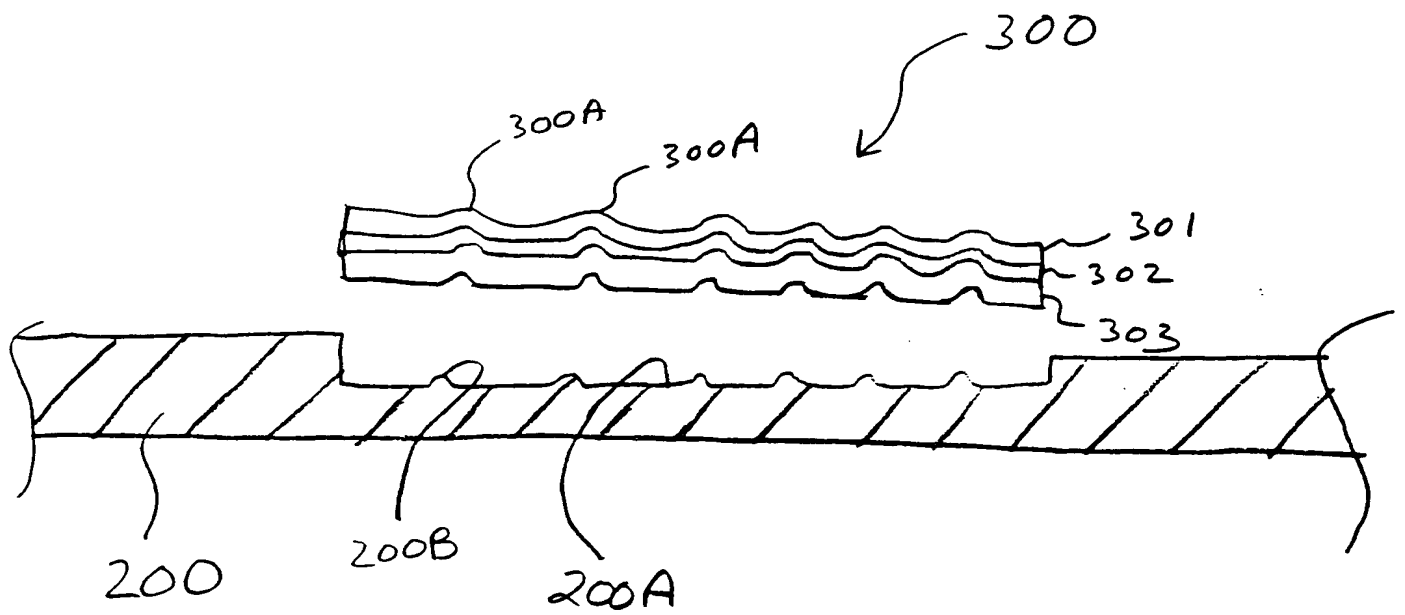


FIG. 10

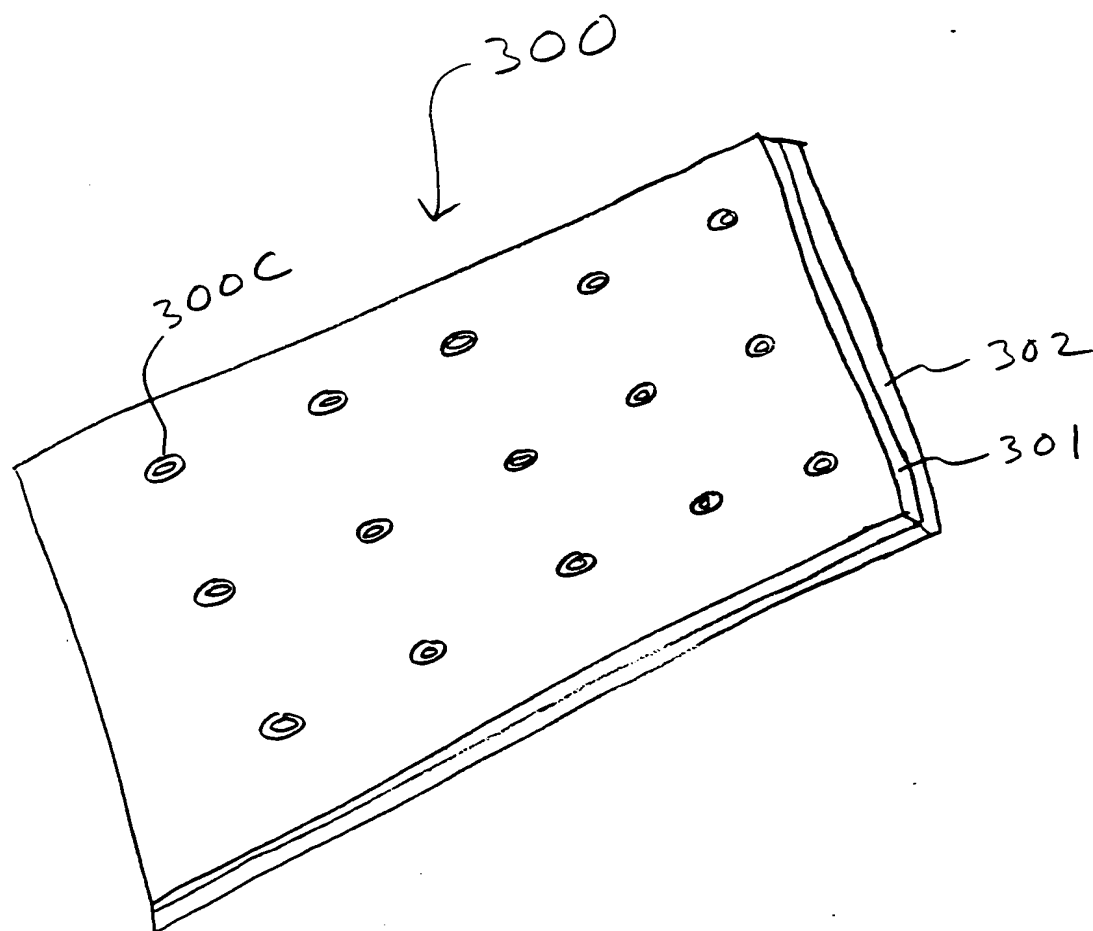


FIG. 11

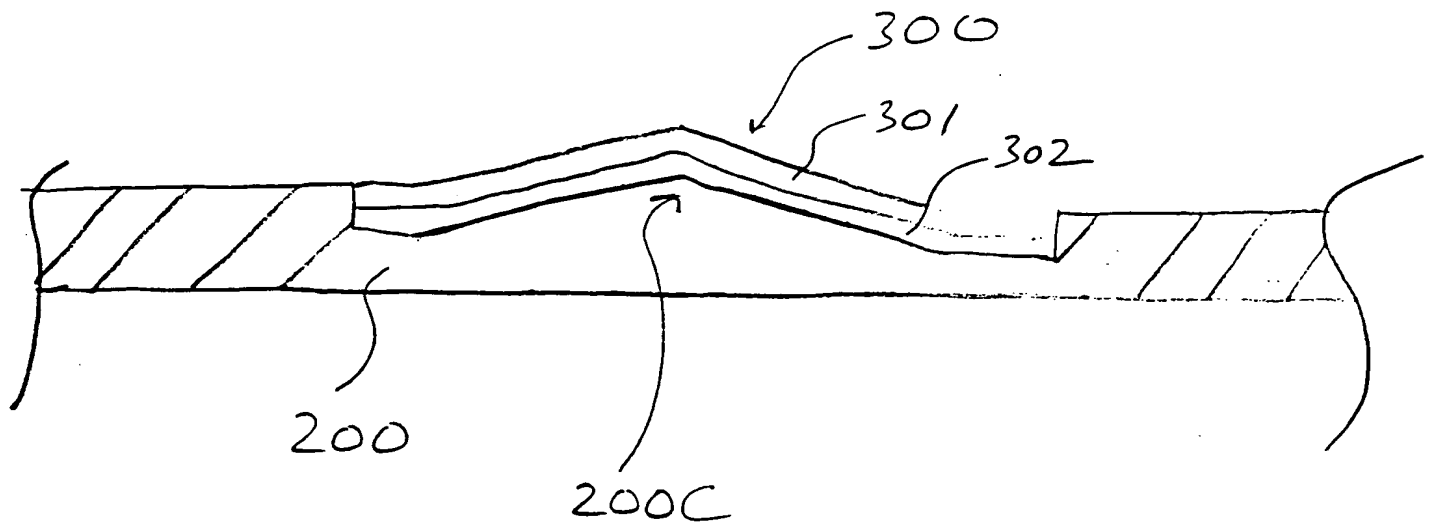


FIG. 12

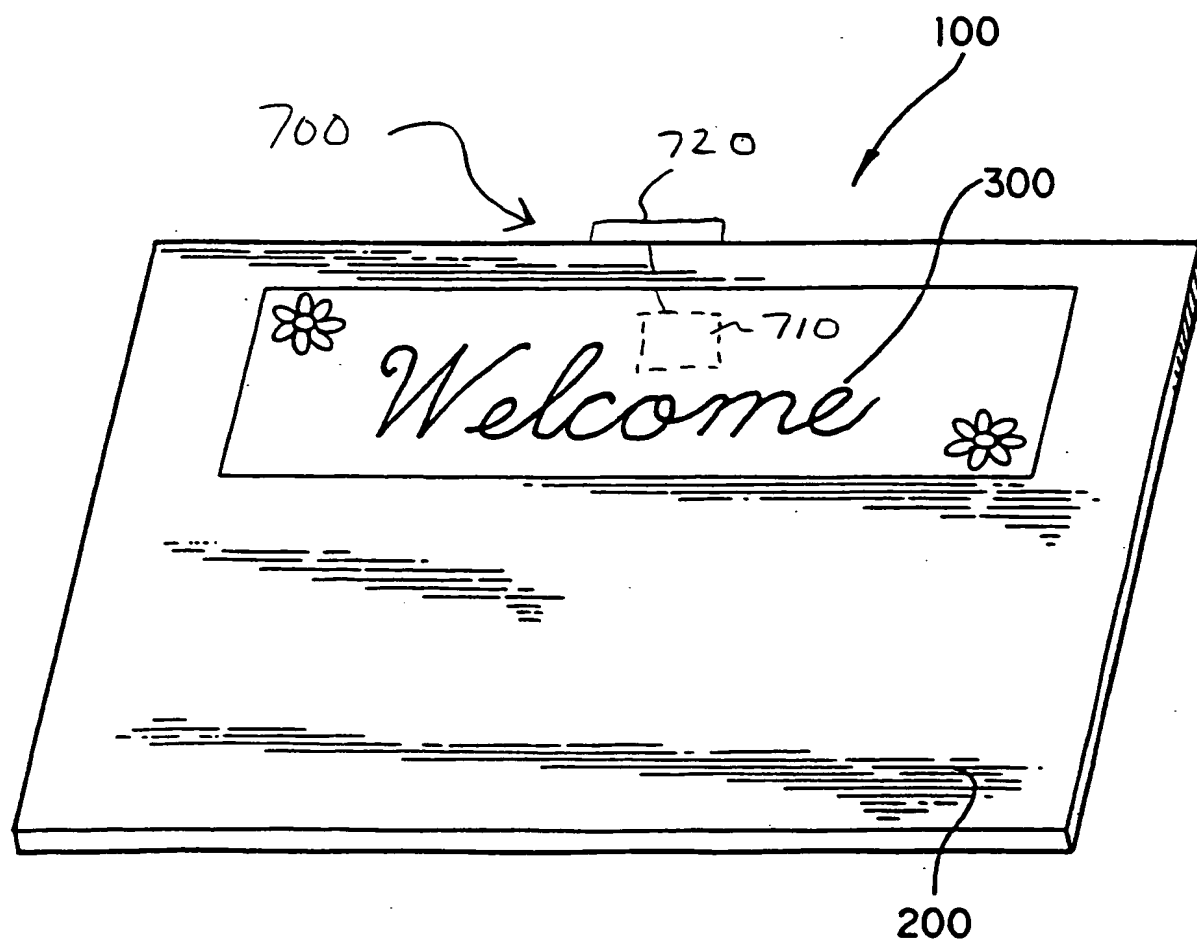


FIG. 13

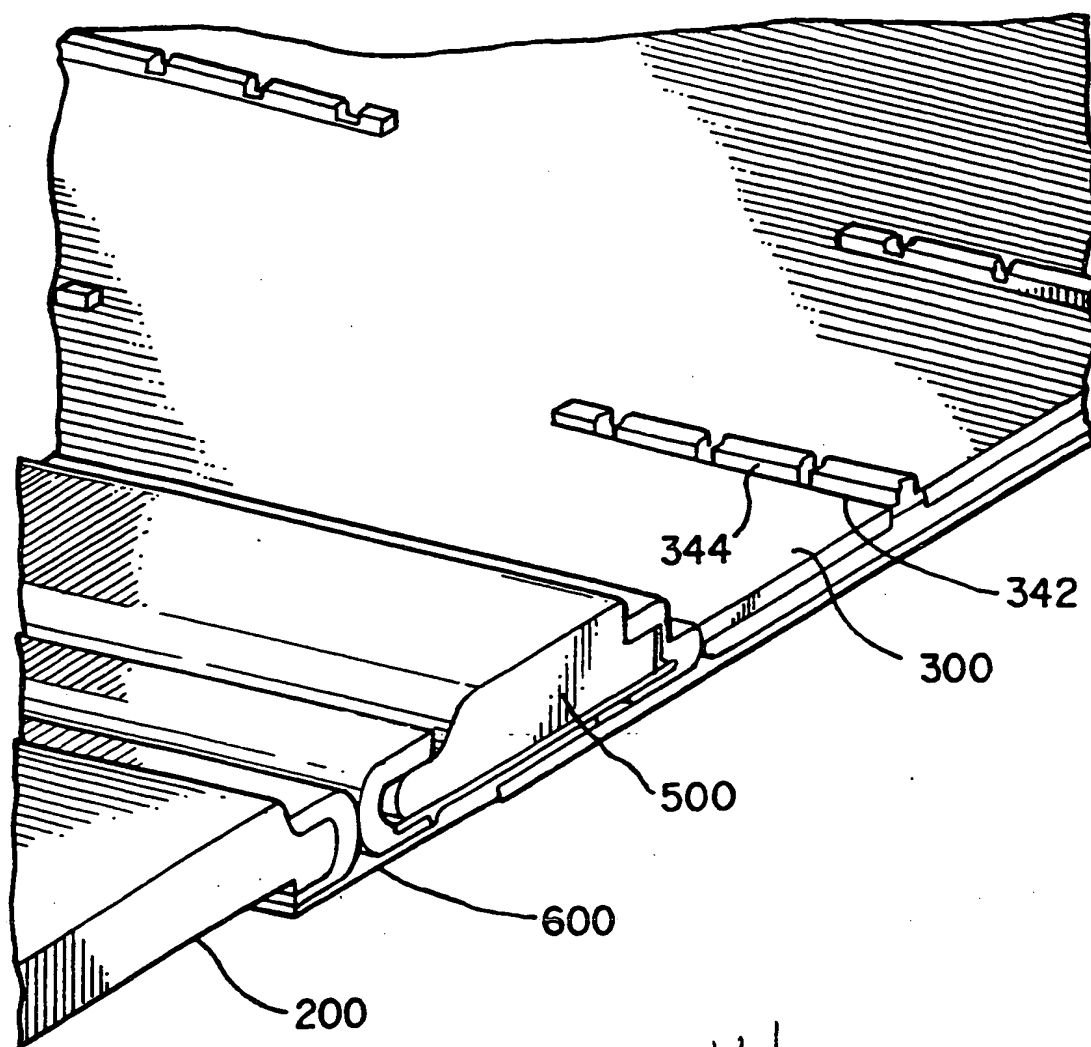


FIG. 14

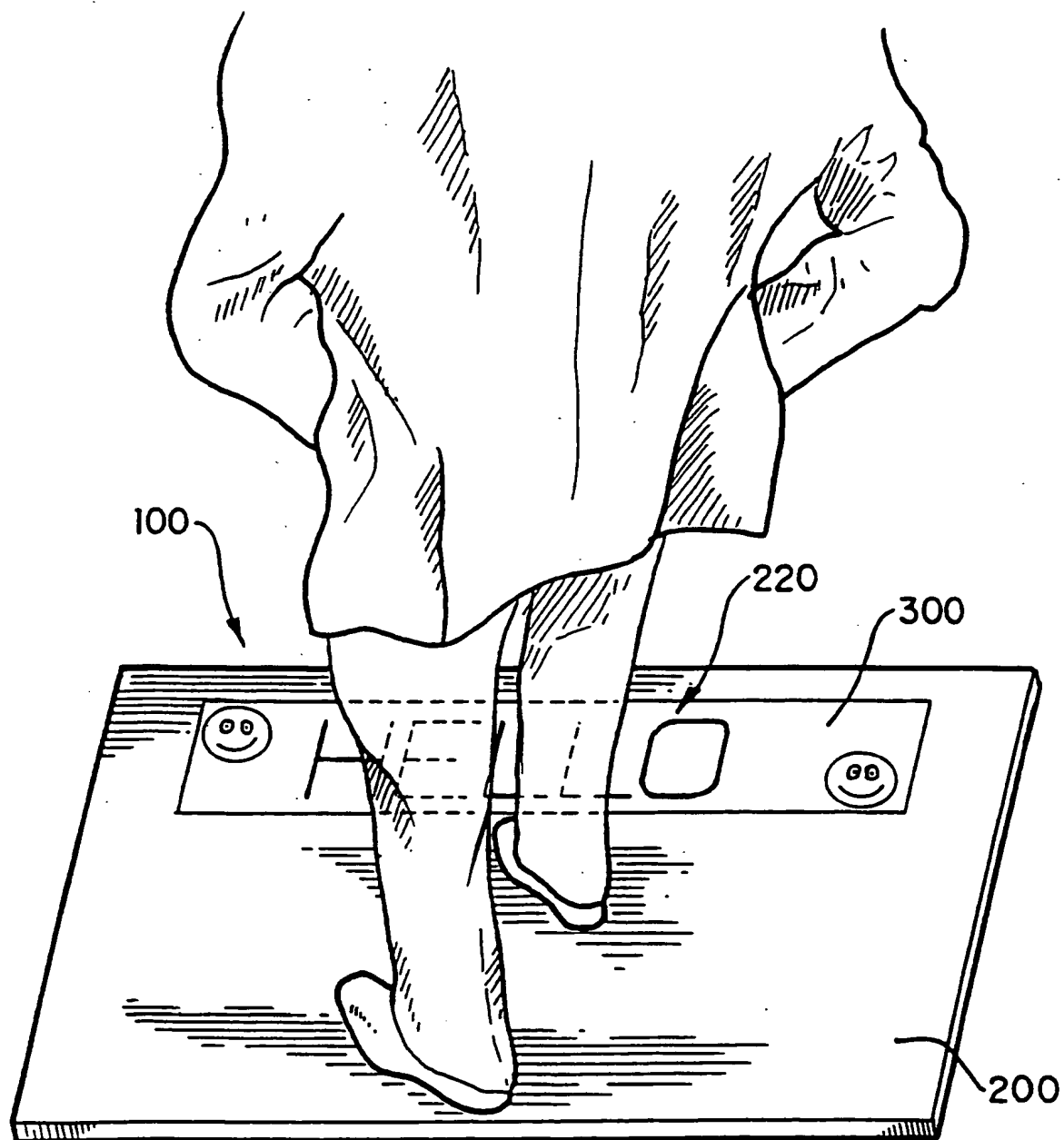


FIG. 15



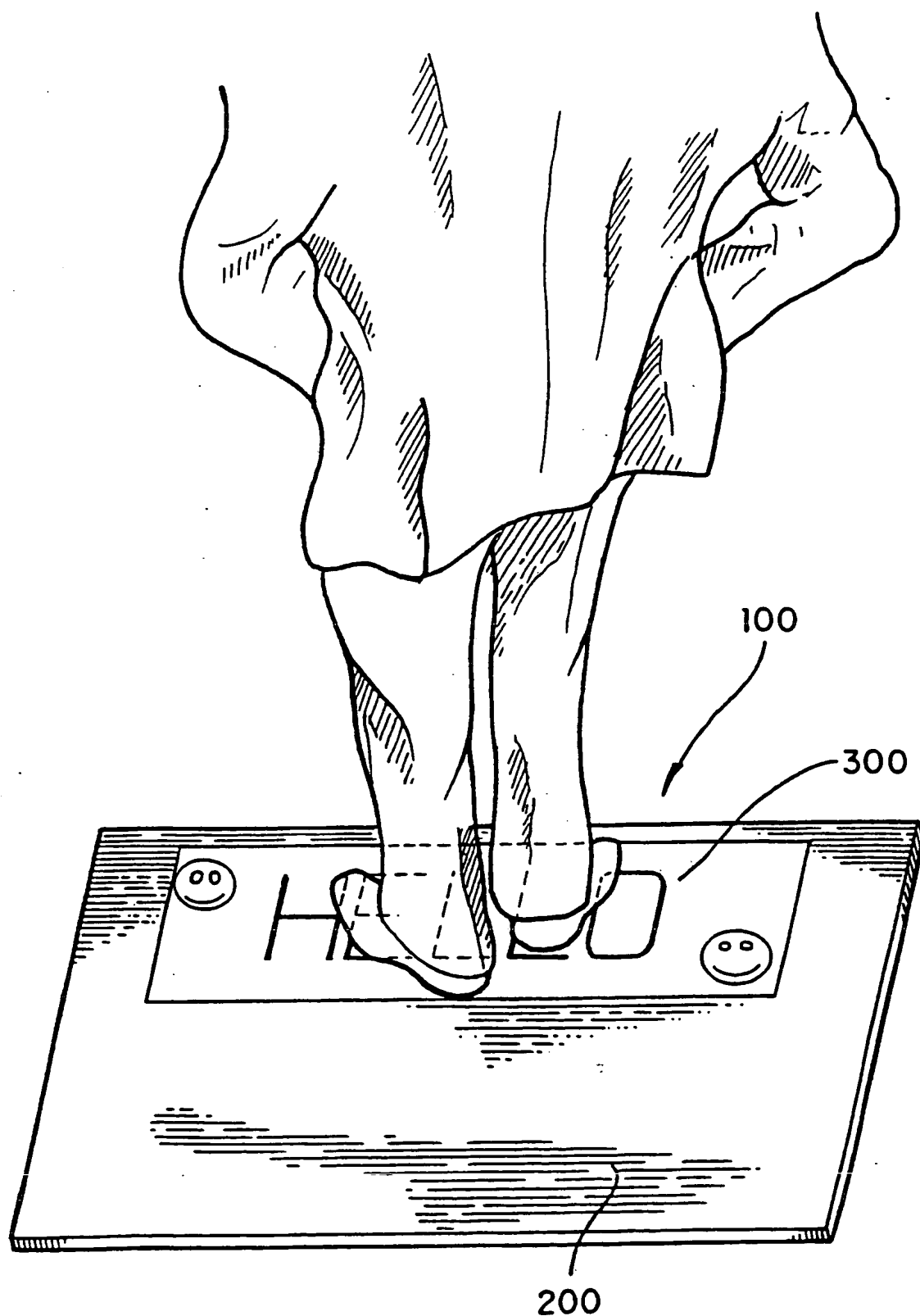
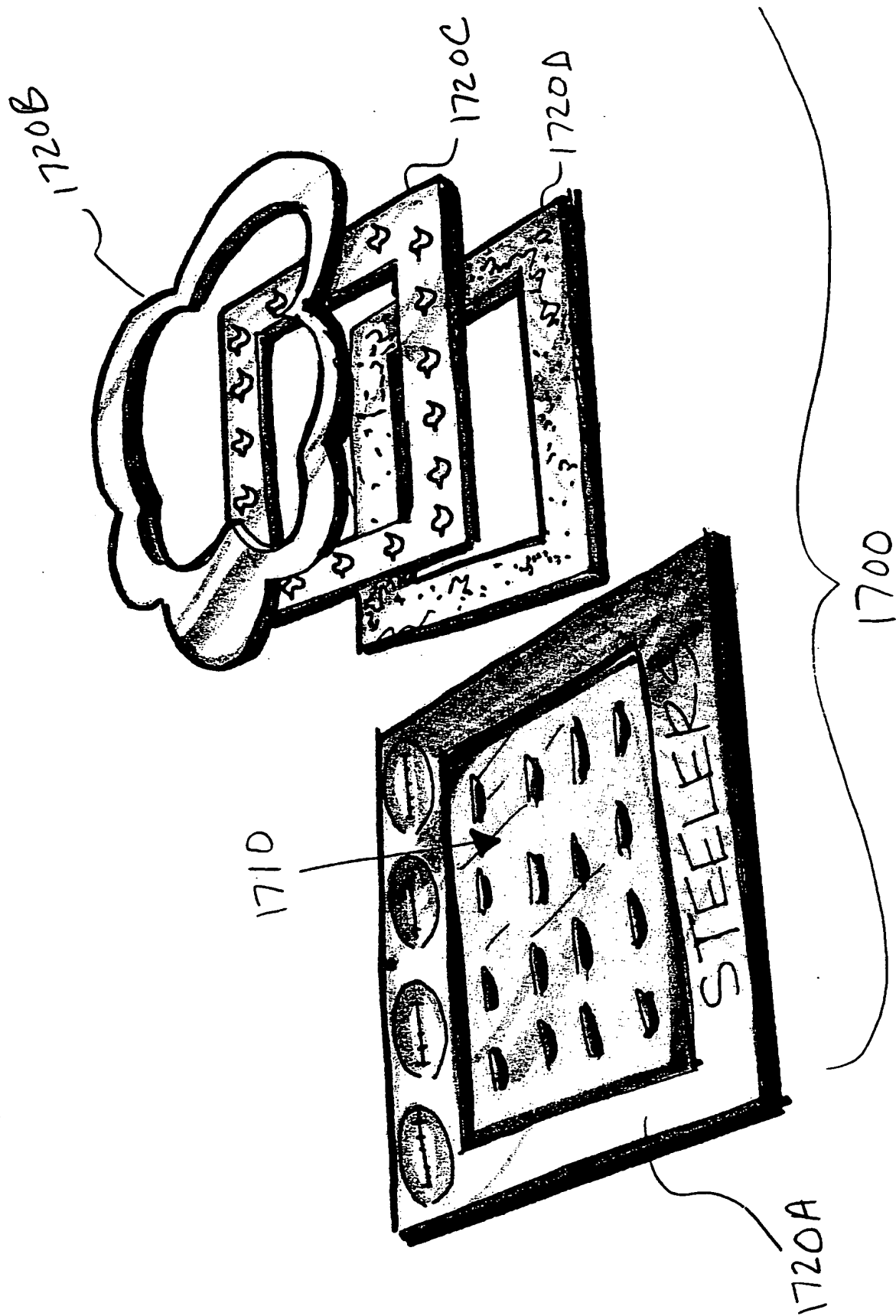


FIG. 16



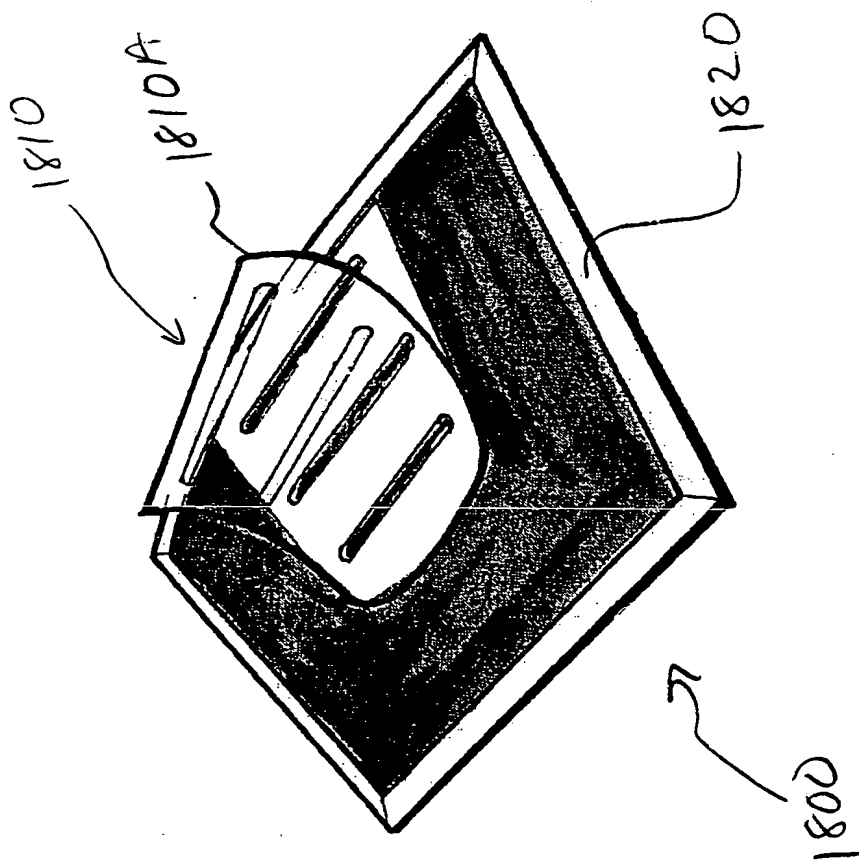


FIG. 18

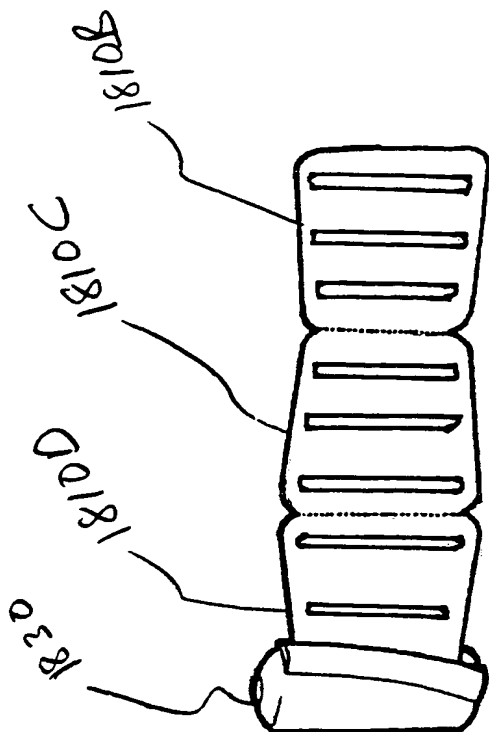


FIG. 19

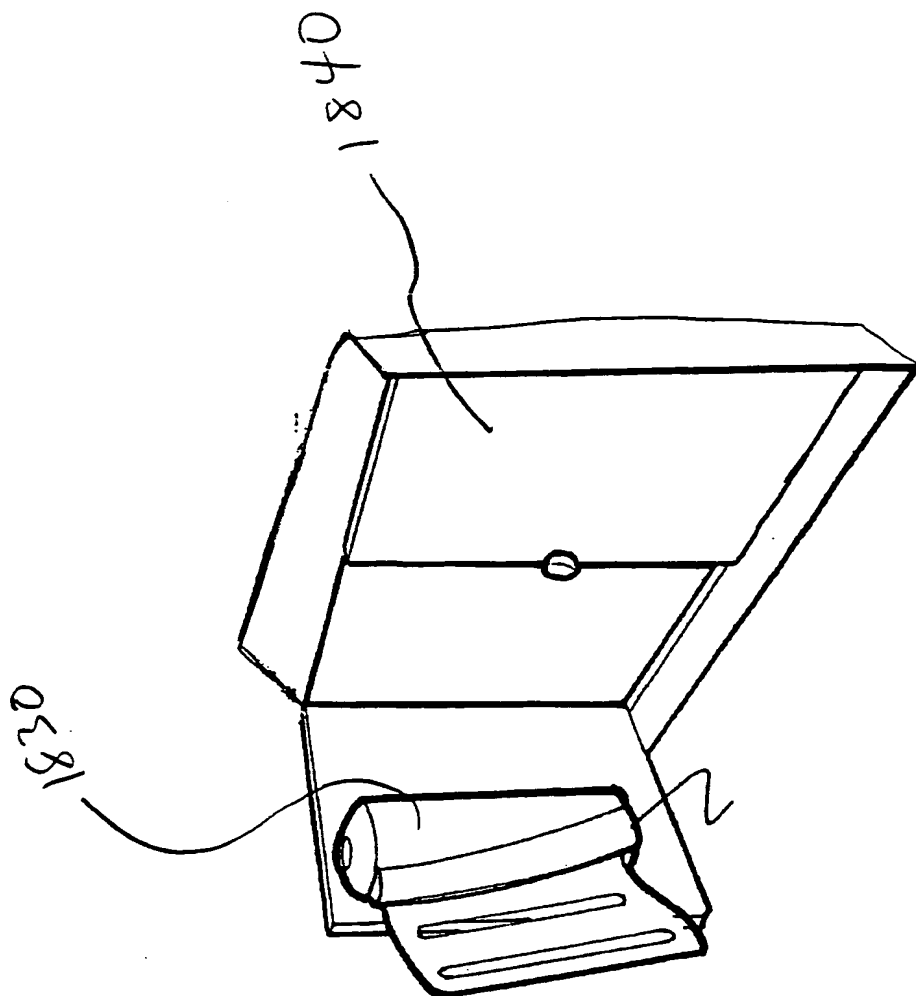


FIG. 20

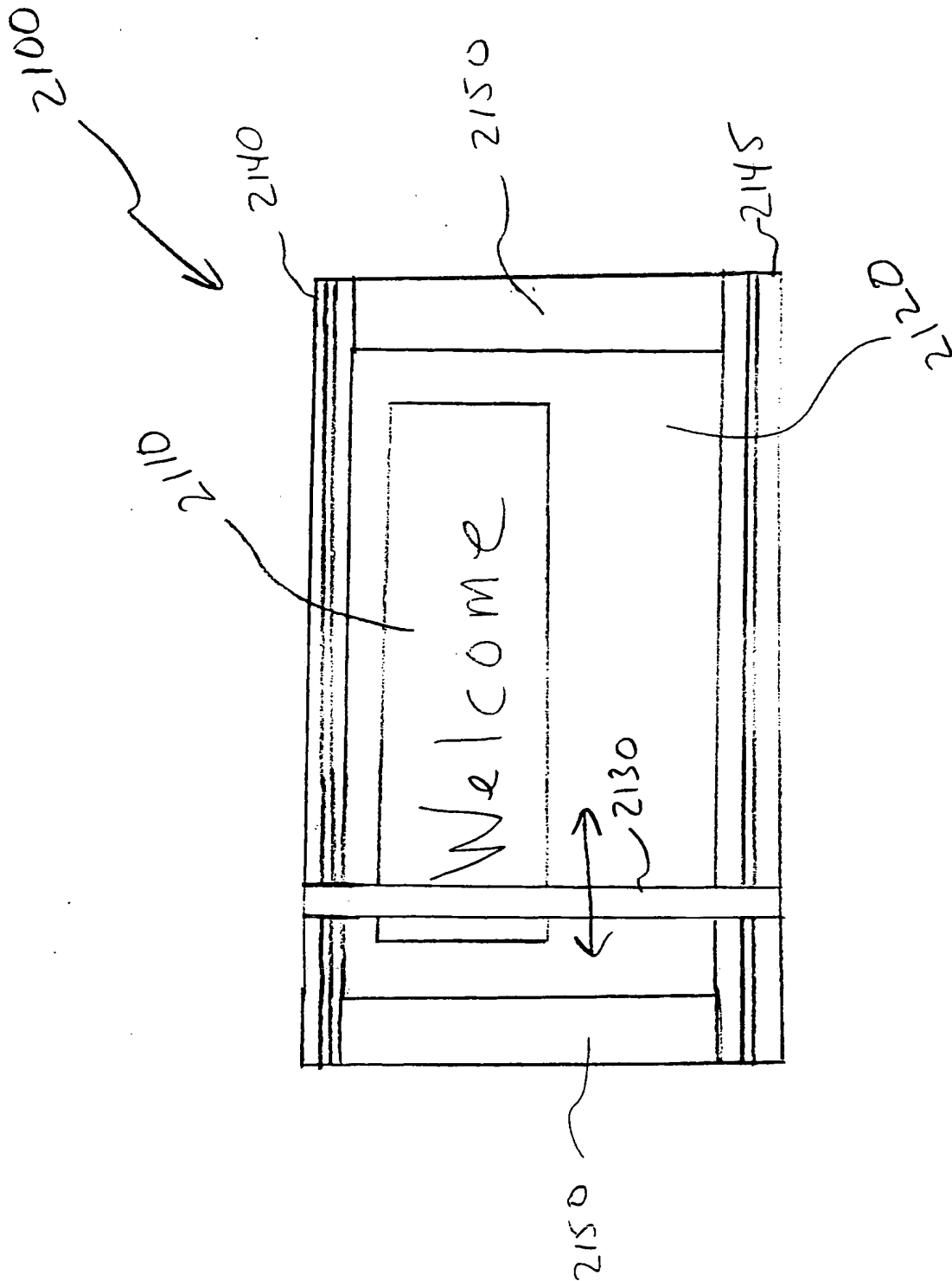


FIG. 21

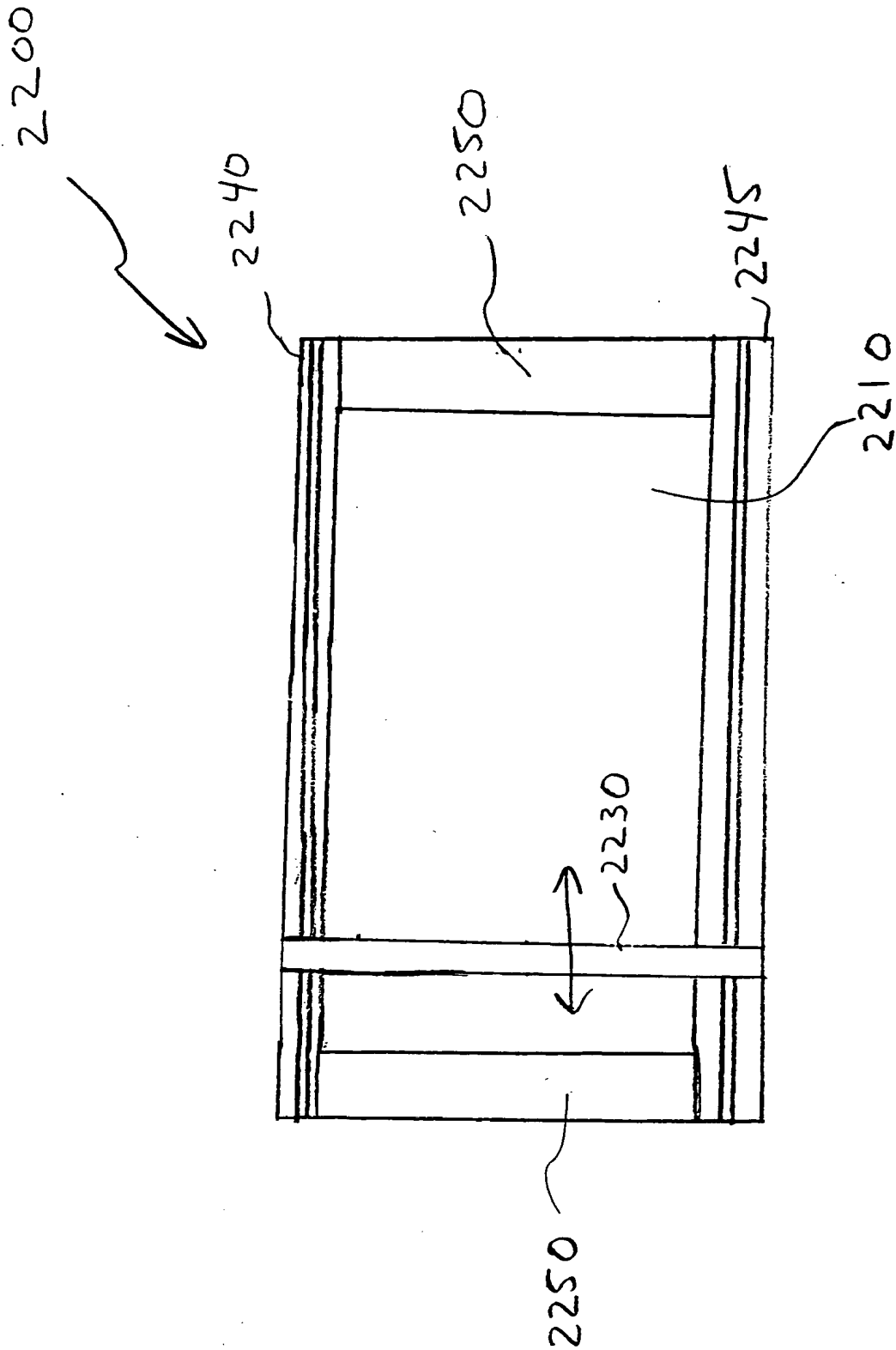
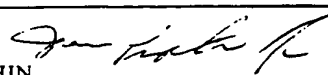


FIG. 22

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US00/11772

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(7) : A47L 23/22 US CL : 15/215,216,217; 134/7 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : A47L 23/22  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 3,083,393 A (NAPPI) 02 April 1963, see entire document.	1-4, 9-11, 15, 16, 50, 53, 54, 67, 69, 70 ----- 5-8, 12-14, 17-49, 51, 52, 68, 71-75
A	US 4,798,754 A (TOMEK) 17 January 1989, see entire document.	62-66, 77-81, 83- 116
A	US 5,839,976 A (DARR) 24 November 1998, see entire document.	55-61, 76
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* *A* *E* *L* *O* *P*	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance earlier document published on or after the international filing date document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) document referring to an oral disclosure, use, exhibition or other means document published prior to the international filing date but later than the priority date claimed	*T* *X* *Y* *A* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family
Date of the actual completion of the international search 27 JULY 2000		Date of mailing of the international search report 11 AUG 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer  RANDALL CHIN Telephone No. (703) 308-0661

Form PCT/ISA/210 (second sheet)(July 1992)\*

